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THE

DENTAL RECORD:

A
MONTHLY JOURNAL
OF
DENTAL SCIENCE, ART, AND LITERATURE,

DEVOTED TO THE INTERESTS OF THE PROFESSION.

EDITED BY
THOMAS GADDES, L.D.S.ENG. AND EDIN.

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THE DENTAL RECORD.

VOL. VII.

JANUARY 1, 1887.

No. 1.

RESTORATION OF THE CONTOUR OF CARIOUS TEETH BY MEANS OF PORCELAIN.

By Prof. W. D. MILLER, Berlin.

EVERY practising dentist frequently meets with cases in his practice where it is not possible, by means of any of the filling materials in common use, to produce results satisfactory either to himself or to the patient.

Such cases are—

1. Extensive defects on the labial surface of the superior incisors and cuspids;
2. The loss of one or both corners of the superior incisors, produced either by caries or trauma;
3. The loss of the entire cutting edge of the superior incisors or point of superior cuspids, either through caries, trauma, or erosion;
4. The loss of the outer cusp of the superior bicuspid.

In all these cases it is always difficult, sometimes impossible, to employ gold to advantage; besides, its unsightly appearance renders it intolerable to many patients. As far as the colour is concerned, cement is far preferable to gold, although it is only with great difficulty that we are able to obtain a mixture which will have exactly the same colour as the tooth, and even then the lack of transparency and polish render the contrast with the natural tooth more or less marked. It is, however, almost useless to attempt to use it in the above-mentioned cases for restoring the contour of the tooth, since a few weeks suffice to wear it away very perceptibly. I have somewhat increased the durability of such fillings by adding pulverised porcelain to the cement, which very markedly retards the wearing away of sharp corners. I am,

however, unable to say whether it would be advisable to adopt this procedure to any extent in practice.

In a considerable number of such cases I have been able, by setting on pieces of porcelain, to produce results satisfactory to myself and particularly to the patient. The operation is least difficult in the first class of cases above designated, and will be described first.

The cavity is so prepared that the walls stand perpendicular to the bottom of the cavity; undercut should be avoided. If the cavity is nearly round, and not very large, it may be made perfectly round by means of a fissure or wheel burr; and then, in the absence of the patient, a piece of porcelain is ground of exactly the size of the instrument used to prepare the cavity. (This is very easily controlled by means of the gauge-plate.)

The piece to be inserted is ground from a porcelain tooth in the manner represented in Fig. 1, and cut off with a thin corundum



FIG. 1.



FIG. 2.

disc at the point *a*, so as to be a little longer than the depth of the cavity. The latter is then partially filled with a white phosphate cement, mixed rather thin, and the piece pressed into place (Fig. 2). After the cement has thoroughly hardened, the porcelain is ground down even with the surface of the tooth, and polished. I have inserted many pieces in this way in the last three years, and have not yet had one to fail. How much longer they will hold before I will have to reset them, I cannot now say. The permanency of the operation may, however, no doubt be increased by setting the piece in gold. In this case it must be ground slightly smaller than the cavity. It is fixed to the bottom of the cavity with cement, and the space between the porcelain and wall of the cavity filled with gold. For this purpose I use an instrument, about 1 mm. wide and as thin as ordinary writing paper, which may easily be made from a broken excavator.

The gold ring is invisible at a very short distance, and the operation is very durable. I have a number of these operations of six years' standing, and one in my own mouth, made by Professor Essig, of Philadelphia, nine years ago. They protect the tooth

quite as well as a gold filling, and as far as appearance is concerned are incomparably better. The operation of preparing the piece of porcelain is rendered somewhat more difficult when the cavity is oval, which is very frequently the case. In this instance I take an impression, and grind the piece, in the absence of the patient, after the model.

In operations of the second class I have obtained still more satisfactory results. Where it is desired to restore the corner of an incisor tooth with porcelain, the cavity is prepared as it would be for inserting a contour cement filling. The border of the cavity must be smooth and as free from sharp angles as possible. I now mark out on a porcelain tooth of proper size (care should be taken to select a tooth which is as thick as the natural one) and colour, with a corundum disc, a corner which is about the size of, or a little bit larger than, the corner to be restored (see



FIG. 3.



FIG. 4.

Fig. 3); grind away the portion *b* on a large corundum wheel, leaving a projecting portion in connection with *a* (Fig. 4), which serves to retain the tip in place. The joint between the tip and the tooth should be perfect on the labial surface; on the palatine it is not so absolutely necessary. Then fill the cavity with an oxyphosphate cement which has the colour of the tooth; also fill around the projecting portion *c*, and then press the tip into place, and hold it for a minute until the cement has sufficiently hardened to prevent displacement. It is absolutely impossible to displace the tips set in this manner after the cement has become quite hard. The greatest danger lies in the fracture of the porcelain at the union between *a* and *c* (by biting on a bone or crust), which has happened twice in my practice. This may be avoided by making the neck of *c* as thick as possible, and making no undercut, which latter is not necessary for retaining the tip. I made the first operation of this kind in 1879, the second in 1880; both are holding perfectly to-day.

Where the whole cutting edge of the incisor has been broken off diagonally (a case now and then met with in practice), it may be restored in exactly the same way. The piece to be set on

is ground from a porcelain tooth, as represented in Fig. 5, and fastened with cement, or we may make use of the pins in an ordinary plate tooth for attaching the edge of porcelain. A model of the tooth having been obtained, the porcelain tooth (*a*, Fig. 6)



FIG. 5.



FIG. 6.

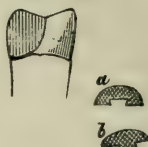


FIG. 7.

is ground down until it conforms in shape to the lost part of the tooth. To strengthen the attachment, a slot or groove may be made in the underside of the porcelain with a thin corundum disc, and also the whole undersurface roughened. The cavity is filled with phosphate cement, the undersurface of the tip also covered with cement and the tip pressed into place. After the cement has hardened, the tip must be polished. My first operation of this category was made less than a year ago, so that I can say but little about its durability. I have, however, unsuccessfully tried various means for removing a tip set in this way, of which the colour did not suit me. Dr. Sachs, of Breslau, who first suggested the method represented in Fig. 6, states that he has frequently employed it to great advantage. For this operation teeth of English manufacture should be used, as they may be polished much more easily than the American; whereas, for operations of the first class, where the natural polish of the porcelain tooth is not removed, the American teeth are preferable, since I have frequently observed, on setting thin pieces cut from English teeth, that they change colour the moment the underside is covered with cement, taking on a greenish hue even when the cement is white.

The fourth case in which I have made use of porcelain as a filling material is where the external cusp of the upper bicuspid is wanting. To build up the cusp with gold is in almost every case for various reasons inadvisable. Amalgam would scarcely enter into account here, and cement wears away almost as soon as in the case of contour fillings in incisor teeth. The use of a piece of porcelain is in this case very easy, and increases the durability and natural appearance of the cusp very much.

The cavity is prepared in such a manner as to retain a large

filling under the pressure of mastication. The porcelain has in cross section one of the forms represented in Fig. 7, *a* and *b*, or some modification of them. The cavity is filled, the inner surface of the artificial cusp also coated with cement, and the cusp pressed into place.

It is not necessary to obtain a good fitting joint, as this portion of the operation will generally be hid from view by the approximal tooth. It is advisable to make the cusp a little bit shorter than the natural cusp, so that the lower tooth does not quite strike it, otherwise it may be bitten off before the cement thoroughly hardens. I have set a number of these cusps in the last two years, and have lost but one. The failure in this case was due to the cause just mentioned. The use of porcelain has been advocated to prevent the wearing away of large cement fillings on the grinding surface, or gutta-percha fillings on the buccal surfaces; but the advantage to be gained in these cases is very doubtful.

No doubt many practitioners have employed the same or various other devices which may be suggested for fixing pieces of porcelain to defective teeth. I give the above simply as some of the methods which I have found most easy of application in my own practice. I have not yet met with a case where the piece could not be obtained from an artificial tooth.

OPERATIVE DENTAL SURGERY.

By WILLIAM ST. GEORGE ELLIOTT, M.D., D.D.S.

(Extracts from Lectures on Operative Dentistry delivered at the National Dental College.)

GENTLEMEN,—It gives me much pleasure, upon resuming our lectures for the season, to welcome an increased number of students and to express the hope that even a still larger number than last year may compete for the Prize Medal given in our department. You are doubtless aware that the requirements necessary to obtain this prize are of no ordinary kind. The practical work required is varied and thorough, and while but one can obtain the coveted medal, all, by aiming to secure it, may become good operators. I pray that you will give close attention to what is said, first, because it is necessary for me to condense in a few lectures what is ordinarily extended over many months; and, second, not to

consider unimportant the little things, as they are frequently the most valuable.

Before we take up our regular subject, I wish to make a few remarks on the condition of dentistry in different parts of the world, from the earliest times to the present. 450 B.C. Herodotus, when in Egypt, noticed that medicine was divided into several branches, and there were specialists for the head, teeth, &c. It is a little odd that specialties existed at that remote period, and still more so that they have not been more fully recognised in our own time. Even now many regular physicians do not believe in these divisions, and, although forced practically to recognise, yet, as far as possible, they discountenance them.

Hippocrates, one of the fathers of medicine, and whose writings have been handed down to us, was perhaps the first to take up the study of the teeth. Heraclidus, Herophilus and Erasistratus (who describes a leaden forceps) were all dental operators. It is more than probable that they were dentists in the sense that chemists and others who had extracted teeth prior to the passing of the Dentists' Act were dentists, their skill being called for only in cases of extraction. Galen, in A.D. 150, taught that the teeth were true bones.

As might have been expected, mechanical dentistry has taken precedence in point of time to operative. Belzoni found artificial substitutes in mummy cases, the carved wooden teeth being retained in position by ligatures. The Chinese have carved teeth from bone, ivory and stone, and this is as far as they have gone in the art; while Japan, receiving its scientific instruction for centuries through China, has gone quite beyond, inasmuch as the Japanese have for centuries made full and partial dentures on a wooden base which served their purpose.

300 A.D. the Arabian, Aetius, discovered the foramina, and from this period to the present the knowledge of the anatomy, &c., of the human teeth has been gradual but spasmodic. Much was done in the latter part of the last century; indeed, with some exceptions, nearly as much was known then as now. There were regular dentists practising as specialists in this country before the time of George III. In America there were none before 1780.

In regard to the present condition of dentistry, my experience in the United States, Japan, China, Strait Settlements, India, Peru, Chili, Buenos Ayres, Brazil, and for seven years in London,

is about as follows:—In the United States there are supposed to be some 15,000 dentists, who, practically, have given a high standard to the profession. This has mainly arisen from two causes: first, the almost universal education of the people as to the value of their teeth, and the necessity or advantage resulting from their preservation; second, the very general use of gold. How this has contributed to that result we will see more fully when we get to that part of our subject; suffice it to say here that I do not think the question of nationality has anything to do in the matter. Abroad one hears of American dentists and of the American system; but in the United States, where the art is practised by all nationalities, one never hears of it. All must come up to the required standard if they wish to succeed. In the United States there are some fifteen colleges, graduating perhaps some five hundred students a year. In this country there are, as you know, two small schools in London, and six smaller provincial schools. The number of registered dentists is now some 5,000, the great majority presumably unqualified, as the passage of the Dentists' Act put a large number on the Register who otherwise would never have thought of calling themselves dentists. Thus, you see, in the United States, to a population of some 55,000,000, there are something like 15,000 dentists in practice, while England, with a population of 35,000,000, has only about 5,000 (including chemists) practising as dentists. Two inferences can be drawn from this fact: either the teeth of Americans require more attention on account of their proneness to decay, or the people here neglect their teeth and do not seek the aid they really require. My own observation leads me positively to the latter conclusion. While it is the exception in America not to consult the dentist frequently, here it is the rule. It is a common thing in my practice to meet with people in the highest walks of life who seldom go near a dentist, except it be for extraction.

Extraction is here far too common. Now, gentlemen, it is your province to change all this. As fine operators as the world can produce now graduate from the English schools, and it is your duty to educate your patients. In my own practice I try to insist that the young people shall be brought to me as soon after two years old as possible, and not less than three times a year. I do not say that I always or generally succeed in getting them to come but I often do, and that is a gain.

Of Continental countries Germany has made the most progress in our specialty. She has established dental schools, under both royal and private patronage, and soon she will be up to the requirements of the day. Austro-Hungary is also making efforts in this direction, while France is waking up, and although no dental law as yet protects her people or the profession, still in her new schools she is trying to educate the rising generation up to a higher standard.

As young men, you may ask me, of the various fields of the world which offer the greatest attraction to the ambitious graduate? Well, my answer is England. You cannot do better than stay at home. South America is well supplied with good men; the Far East is rather more than well supplied. There is still plenty of room in India, Ceylon and the Continent, as well as in Australia. I have observed a curious fact in regard to fees; for the same work the fee is about the same all over the world; and for the time taken it is generally two guineas an hour, the charge not being made by time, but on the basis of time. In China, eight teals; Chili, ten dollars; Buenos Ayres, nine hundred dollars; but when you consider the discount of the paper money, ninety-five per cent., the price is about the same. Fees have steadily advanced in the last twenty-five years. I knew a dentist in Lima, Peru, who, a quarter of a century ago was charging one dollar a stopping; when I met him a few years since his charge then averaged £2. Of course there had been an advance in the character of the work as well. I mention these things to you, gentlemen, to show you that you cannot do better than stay at home.

While speaking of dentistry in this country, I ought to mention one obstacle that has been in the way of progress—that is, the guinea or uniform fee. Dentists are not angels, and they are not going to give one guinea's worth of gold and two guineas' worth of time for a single guinea fee. Plastic dentistry is too highly paid, while high-class, tedious and thorough dentistry, is not yet appreciated by the masses. People are willing to pay a guinea for consultation, or a fifteen minute stopping, but they object to five guineas for a case of successful treatment or a compound contour stopping. Time will alter all this. The public will finally settle down to asking and receiving a fair fee for the labour, &c., expended on each case.

There are some differences between the United States and England in the way in which dentistry is practised, and perhaps the most prominent one is that, in the larger cities of the United States, they have specialists for extraction. When a dentist of good repute establishes himself as a specialist in one of these towns, a large number of the profession will send him their extraction cases, it being understood that the specialist does no other work. It is a curious fact that in some cities the specialist has the largest income. The gain to the public by this system is great: first, by having the cost reduced to eight shillings with gas; and, second, the great skill the enormous experience gives. There are some other differences in the conduct of practice, but perhaps not greater than exists between one part of the same country and another. In the Eastern States of America the use of a female assistant is very common; in the West the surgery or office is frequently, if not generally, located in chambers like those of a solicitor. In England and on the Continent men-servants are commonly employed; in America, never. In the United States there is a tendency in the larger cities to develop a specialty in the way of operations, and as the number of operators far exceeds those who give special attention to artificial dentures, I think artificial work is, as a rule, better done in this country. The fees in the United States are, for the same class of work, probably lower than in any other country, but in no other are they as high for exceptional work. I have a case in mind where a dentist received in America the sum of £65 for a single stopping; but nine-tenths of the gold work does not average £2.

I have stated that the people in this country neglect their teeth; the great majority do not clean them enough, nor have they been taught how to do so properly. I do not think I have ever seen a person who kept his, or her, teeth too clean. I have seen many who have brushed them very injudiciously, and this fault, as well as the greater one of neglect, can in part be laid at the door of the profession, as, in too many cases, patients are not taught. The way is very simple. As a rule, use a hard brush of the ordinary shape—no special shapes are necessary—dip the brush in water and cover it well with tooth-powder ($\frac{2}{3}$ chalk and $\frac{1}{3}$ powdered pumice stone is the basis of the powder I have used for 15 years, and although coarse, when properly used it can do no harm), then holding the brush nearly vertical clean the inside of

the lower incisors first. Why first? Because most of the tartar is found there. Then pass the brush back and clean well the *inside* of the teeth of both jaws; then passing to the outside, the brush is only to be rotated from the gums in each jaw: this forces the bristles between the teeth, and no matter how coarse, the powder is not likely to do any harm. My experience teaches me that the teeth cannot be kept clean without a coarse powder, while with it it is not difficult. I tell my patients that if they will closely follow directions they should never require to have the tartar removed. It is all nonsense to talk about erosion being ordinarily produced by the tooth-brush, and for this positive reason erosion, *per se*, has nearly always a sharp edge, the enamel defining it. No brush, no powder, could produce this edge; on the contrary, if you will try the experiment, you will find that the brush always destroys the sharp edge and produces a rounded one.

Some of my seemingly neglectful patients, when spoken to on the subject, tell me they take great pains and clean their teeth six or eight times a day; perhaps they do, but if so it is labour misemployed, and if they would be as careful in the use of the tooth-brush as they are about the set of a necktie or the arrangement of the hair, there would be less decay. I often tell these people that they should never lose a tooth or have a toothache if they would only keep their teeth clean and have them frequently inspected.

What I have to say to you in regard to extraction will not detain you long. As you know, I believe extraction is seldom necessary, except for regulating purposes. You will require at least five forceps for the upper jaw; one each for right and left molars, one for bicuspid, a straight one, and also a bayonet stump forceps; for the lower two molar forceps (one cow-horn), and some three sizes of curved beaks. The necessary directions for extraction are: get a good hold, and do not mind the alveolus; always loosen the tooth by to and fro and semi-rotatory motion before attempting to draw it; be guided by the sense of resistance, that is, move the tooth in the direction of least resistance; unhook where you can, and always extract a tooth by skill and not by force. Your knowledge of anatomy will not help you as much as delicacy of feeling.

I have objected to indiscriminate extraction. Why? Every tooth taken out renders three teeth either useless or partially so. First, the tooth extracted; secondly, the one above or below;

and, thirdly, the teeth on either side the one extracted, not being supported laterally, fall partially over, and the force of mastication, instead of being in line with the axis of the tooth, is oblique to it, the result being not only a loss of articulating surface by the falling over, but tenderness, limiting, if not destroying, the usefulness of the tooth. Teeth taken out before the patient is twelve years old do not come under this rule, as generally the space is subsequently closed; but this is not always the case. When it is desirable to extract a tooth to make room, choose a decayed one if possible, but remember that it is best not to regulate teeth until Nature has been allowed time to do all that she will in that direction; between the ages of twelve and fifteen is soon enough. I need not go into the question of anæsthetics; there seems to be so little objection to gas that it is nearly always given to those who can afford to pay for it, and no other anæsthetic meets the requirements of the dentist in the matter of time, &c.

(To be continued.)

A PROFESSIONAL HOLIDAY.

By GEORGE CUNNINGHAM, B.A.Cantab., D.M.D.Harv.

(Continued from page 543, Vol. VI.)

LEAVING Vienna overnight, we were aroused from our slumbers to undergo the inevitable searching nuisance on passing from Austrian into German territory. The morning, however, was too fine and the scenery too picturesque to permit our even attempting to further eke out our inadequate sleep. The river runs through one of the most charming districts it is possible to imagine. Saxon Switzerland, as it is called, is indeed unique, and we carefully noted one or two very charming spots for that good time coming when we hope to have time to exhaust its beauties.

An almost too rapid run brought us to our next halting place, Dresden. Here our main object was to see the far-famed Royal Gallery; we were therefore careful to do this thoroughly before we made any professional calls. The usual travellers' sights were soon disposed of, thanks to the genial companionship and guidance of the son of a well-known leader of the dental profession. Some of our readers may remember an interesting article on "A Day's Practice," from the pen of Dr. Jenkins, one of the best known and most respected of American dental practitioners practising on the Continent. A day at the chair with one of the best exponents of the conservative treatment of the dental organs is certainly neither

the least enjoyable nor the least profitable way of passing a day in the course of a professional holiday. Such a day I passed with Dr. Jenkins at Dresden. In his mechanical laboratory two very excellent automatic electric regulators for the vulcaniser were at work, which so impressed me with their usefulness that I have one now going in Cambridge, and after a sufficient time for trial and experience I propose to introduce it more thoroughly to the attention of the profession at one of our societies. Once the apparatus is properly adjusted all that one has to do is to set it for the required pressure and the time for vulcanising, and then, having lit the gas under the vulcaniser and the gas jet which excites the thermopile regulating the electrical part of the apparatus, the entire process is completed automatically; that is to say, when the required pressure in the vulcaniser is reached the electrical apparatus releases the clock movement and controls the temperature during the time of vulcanising, and when that has expired cuts off the gas supply.

A run of a few hours brought us to Leipzig, where we spent most of our time examining the Dental Institute of the University there. It was opened late in the year 1884, and as the rules and regulations with regard to graduation are very similar to those in the sister Institute of the Berlin University, I shall defer an account of these until later on. The Dental School is a State institution, and being carried on in a building belonging to the University is, therefore, rent free. It also has a subsidy from the State. It seems that the pastor emeritus Huth bequeathed a sum of about £600 for the technical outfit of a dental institute, which sum Professor Hesse so expended after the State had put the building in order. The staff consists of the Director (Professor Hesse) and two assistants, one for the operating, and one for the mechanical department. The Director has a small salary and receives the students' fees, out of which, however, he pays the salary of one assistant, as the State at present only allows the salary of one. What I may term the administrative work of the dental department is carried out by a lady secretary or book-keeper. In addition to that there is a janitor who, besides fulfilling the usual functions of his post, from his having been a locksmith, is extremely useful in making repairs of chairs and other apparatus. A very ingenious and convenient little instrument case, of which most of the students have several in use, is manufactured

by this handy servant. The fees of the Dental Institute are inclusive, and arranged upon a somewhat peculiar plan. The course required extends over two years, and for the first half-year the student pays 200 marks, for the second 150 marks, and for the third 100 marks; the last half-year of all is free. The operative department is open from 1—5 p.m., and the mechanical department all day long. The only special dental lectures arranged for are an exhaustive course on Operative Dentistry, by Professor Hesse, and a special course, with demonstrations, on General Pathology and Surgery for dental students, by Dr. Karg.

A very large apartment has been specially adapted for the purposes of the school, and divided into an operative and mechanical department. There are four operating rooms, all communicating, lofty and with a good light, containing ten operating chairs, each provided with spittoons and bracket tables. There are three Wilkerson chairs, three White Cycloid chairs, and four of a German make equally luxurious. Professor Hesse encourages the student to learn to operate in a sitting posture for certain operations, and therefore low wooden stools are provided for the use of the students. The equipment also includes five dental engines belonging to the Institute. Opposite each chair is a small black board for diagrammatic explanation and a convenient wash-hand basin in each operating room. The patients are examined by Professor Hesse, and then passed on to the student, who is directed as to what operations he shall perform, except in such cases where the patient is reserved for a demonstration by the Professor or his assistant. Professor Hesse does not confine the educational influence of the Institute to the mere execution of the dental operations, but endeavours to create a spirit of thoroughness by careful attention to minute details—for instance, a complete and thorough record of the operations performed for each patient is carefully kept and the patient encouraged to return for periodical examination. To me it was indeed a great gratification to see such a system in use here. The Edinburgh Dental School, I believe, is the only one in our own country which has adopted such a system. Then, again, if a student is late in keeping his appointment with his patient the patient is given to another student, while the student is further punished by having his name withdrawn from the list of operators for a week.

The development of manual dexterity and inventiveness is

stimulated by the Professor encouraging the students to make such instruments and appliances in operative work as they deem most practicable.

The mechanical work is carried on in a similar set of rooms to the rear. There is a special plaster room, with another larger for vulcanite work, furnished with six lathes, three vulcanizers, and the usual bench fittings, while a third room is devoted entirely to metal work, and furnished with all the necessary apparatus, including a very beautiful set of rolling mills. The mechanical work includes demonstrations in continuous gum work, for which a proper furnace is fitted up. Actual practice in this work is, however, confined to those students who can pay for the platinum plate. For the ordinary work the student pays no contribution.

The patient pays at the rate of two marks per tooth for vulcanite work, with an additional charge of two marks for the plate; there is no special tariff for metal work, but, as a rule, the patient pays the actual cost of the gold, and a fee of about three marks per tooth. The patients also pay fees for the operative work according to the nature and extent of the operation. The tariff in Leipzig is as follows—extractions 0·30 marks, scaling 1 mark, cement and amalgam fillings 1 mark, tin fillings 1·50 marks, gold fillings from 2 to 5 marks, and root fillings 1 mark extra. The total amount so received from patients nearly cover all the actual working expenses of the Institute, including the cost of the services of the book-keeper and janitor.

Professor Hesse, in his endeavour to make the Institute of educational effect both on the patient and the student, does not encourage the Institute to be frequented by the patient who comes for a casual extraction. These latter usually find their way into the hands of the dental surgeon attached to the Polyclinic.

I carefully examined the collection of teeth which have been extracted in the Institute, and it certainly was a proof that only extremely advanced cases of dental disease were treated by extraction. It has often struck me what a really demoralising training it is for the dental student to be permitted to take out numbers of teeth which he knows might be easily saved; and it surely seems a poor defence to urge that, simply because the patient, in his impatience from suffering and in his ignorance of the results, is desirous of having a possibly permanent injury inflicted upon himself, the dental surgeon or dental student is therefore bound to

become a participant in the perpetration of that injury. In another way Professor Hesse endeavours to make the patient sensible of the moral effects of extractions, as he does not use nitrous oxide in the Institute. The majority of extractions, he holds, are easy, and therefore do not require an anæsthetic. Where the case is difficult, or the number of extractions are great, he thinks the narcosis of nitrous oxide is too short, and therefore in all severe cases resort is had to chloroform.

Another peculiarity of Professor Hesse's is that he has taken no steps to form a dental collection or museum, as he says he does not care for "curios," or deem them of much educational value; hence I was able to carry away for our museum of Cambridge the few interesting models of abnormalities that he possessed.

No special notice or advertisement of the school is issued with a view of attracting either patients or students. The present number of students is about twenty, so that each student is occupied operating three entire afternoons in the week.

In discussing with Professor Hesse what I thought certain deficiencies in the didactic teaching of the school, I rather took exception to the "one man power" system of the Institute, as I could not help thinking that the results might be disastrous in less able hands than his; at the same time, I would strongly recommend the Institute as worthy of a careful examination by any dental practitioner who may be anywhere in the vicinity, as it is a good illustration of the benefits derivable from an earnest and systematic application of such one man power, and as in this case earnestness, enthusiasm, and continued application have resulted in an educational institute, which for thoroughness leaves many of our own institutions in the shade.

The following abstract of the work done in the Leipzig University Dental Institute may be of some interest :—

No. of Students.	Fillings.	Gold.	Tin.	Amalgam	Cement.	Roots.	Total.	Extractions.	Scaling.
	*Winter, 1884/5...	71	...	110	115	54	296	245	...
11	Summer, 1885 ..	74	...	132	110	38	354	470	16
19	Winter, 1885/6...	217	16	124	156	96	609	397	38

* These operations were executed during the first semester of the existence of the Institute.

The record of the mechanical work executed is as follows :—

		Exercise Cases.	No. of Teeth.	Practical Cases.	No. of Teeth.
Summer, 1885	...	19	244	25	101
Winter, 1885/6	...	82	726	38	238

In considering these tables it should be remembered that, in the summer session there were five first half-year and six second half-year students ; in the winter session, ten first half-year, five second half-year, and four third half-year students.

(*To be continued.*)

MAN'S LOST INCISORS.

By ANDREW WILSON, L.D.S.Edin., Lecturer on Dental Anatomy and Physiology at the Edinburgh School of Dental Surgery, &c.

HAVING taken part in the discussion of the question of which are the missing incisors in man, I read with much interest the paper by Professor Windle and Mr. Humphreys in last month's RECORD ; and as some parts of it appear to me rather unsatisfactory, I venture the following remarks on the subject.

As preliminary, I have to take exception to a few points in the paper as tending to confusion : Firstly, is it advisable to divide supernumerary teeth into the two groups—supplemental and supernumerary—considering the variety of intermediate forms met with ? Secondly, is there any justification for the use of the expression “substitution” as applied in describing Series IV. and V. ? Is it not really just the normal lateral assuming the conoid or rudimentary form ? And, lastly, to the want of precision in giving the position of the supernumerary, “behind” generally meaning in the paper within the arch ; but we are not told whether it is to the mesial or distal side of the normal tooth in the arch related to it. I think I am safe in saying, that when supernumerary teeth—giving the term its broad and natural meaning—are present in the incisive region, they are almost always inside the arch, and either close to the centrals or between the centrals and normal laterals. We rarely meet with them outside the arch, and still more rarely to the distal side of the normal lateral.

I have now met with fully a dozen cases in which there are five incisors of normal form present, and in by far the majority I

can pair off the I^3 on the one side with the I^2 on the other, the minority chiefly consisting of those in which neither of the two on the one side are equal in size to that on the other.

Two cases in my collection seem most unaccountable, as of the incisors on the side which has three, the I^2 is a well-marked lateral for the *opposite* side. In the one, this tooth is inside the arch to the mesial side of the I^3 , while in the other the two laterals form a geminated tooth, the two being joined at the mesial surfaces of their crowns only, the roots being quite distinct. Evidently the authors of the paper have not met with any case showing *three* well-marked *central* incisors along with the normal laterals. In my paper I mentioned one such case as being in the Odonto-Chirurgical Society's Museum, and since its publication other two such cases have been met with here-- one by Mr. Bowman Macleod, the other by myself.

These cases seem to me fatal to the view that the missing incisor is I^3 .

Regarding the succession of a supernumerary incisor in the temporary set by another in the permanent, I noticed, in a note to my paper,* one such case as having come under my own observation; the case lately recorded by Mr. J. S. Amore is the only other I have heard of.

It is rather surprising that so few cases are on record of either supernumerary teeth or suppression of incisors in the temporary set, due most probably to the arch not being disturbed, so not calling for dental attention and consequently overlooked.

I have only met with two cases of suppression. We gain no assistance in settling this question by reference to the nearest mammals. No case, so far as I know, is on record of any extra incisors in the quadrumana. As regards suppressions, there are two genera of lemurs with only two lower incisors (I^1 or I^2 ?), and one genus in which all the four upper ones are wanting.

In conclusion, I may mention a very interesting case, of which I have a series of models in my museum. The father of the subject (a medical specialist) has one of his upper laterals suppressed, and the father's mother had both suppressed.

In this case one of the temporary laterals was suppressed, but there existed a space which it should have filled. When about

* Trans. Odont.-Chir. Soc., March, 1885.

five years old a somewhat caniniform tooth began to erupt, which his father thought might be the missing tooth. I told him that it was one of the permanent set, but whether a lateral or a small canine it was as yet premature to say.

It turned out to be the permanent lateral, and is now doing duty along with its permanent colleagues.

THE ODONTOLOGICAL SOCIETY.

THE Ordinary Monthly Meeting was held on December 6th, 1886, Mr. CHARTERS WHITE, President, in the chair.

After the minutes had been read and confirmed, Mr. THOMAS ARNOLD ROGERS, who was warmly applauded on rising, said: Before the business of the evening commences, I beg permission to say a few words—to thank the Society very much for the great honour they have done me in placing my portrait on their walls. When, a few months ago, I acted as spokesman on a similar occasion, I little thought my own turn was so soon to come. I should certainly have expected as soon to be summoned to Windsor to be made a duke, and of the two honours I would much more covet the one you have done me. When I read Mr. Parkinson's words, I could not help thinking that he had allowed his friendship to influence him in saying much more of me than I deserved. I have been very much struck by the generosity and kindness of the profession; they not only confer every office and distinction upon those who, in their judgment, they think worthy of them, but they still further honour them for accepting those distinctions. I can only thank those who have contributed to the funds for the portrait, and thank the Society, through you, for allowing the portrait a place on your walls. (Loud cheers.)

THE PRESIDENT: Gentlemen, you have heard the modest way in which our dear friend, Mr. Thomas A. Rogers, has spoken of our acceptance of his portrait. I certainly think we could not do otherwise than receive it with delight, when we consider what he has done for our profession, the long time he has been amongst us, and the urbanity, kindness and general interest he has extended to all, from the oldest to the youngest. I need not take up any more time, but feel that the applause with which you have received him is sufficient answer to what he has said. (Cheers.)

The PRESIDENT then read a letter from Mr. G. A. Ibbetson, offering his warmest thanks for the honour conferred upon him by electing him an Honorary Member of the Society; and, as one of the founders of the Society, referred with justifiable pride to the high position it had attained, feeling sure it was destined to a yet higher place among the learned and scientific societies.

Mr. J. H. MUMMERY then showed models of a regulation case of rather an unusual character, together with the appliances used in treating it. The patient, a young lady aged fourteen, had lost all the molars in the upper jaw owing to repeated attacks of periostitis, and the difficulty of the case arose from the fact that it was necessary to regulate the front teeth in the absence of the molars. This was, however, satisfactorily accomplished in the course of about twelve months, great caution being necessary, owing to the delicate state of the child. He also showed a small electric battery and light which he used in examinations, the feature in which was that it was composed of two cells, one empty and the other charged, and it was only necessary to lift the carbons from one cell to the other to obtain the light. There was only one fluid required, and the battery required re-charging but once in ten days with ordinary usage. It was supplied by Messrs. Meyer and Meltzer.

Mr. HERN read notes of a case which derived its chief interest from its rarity, and was similar to that brought forward by Mr. Hutchinson about the beginning of the year, being a case of ophthalmic trouble due to dental irritation. The patient, a man aged fifty-six, was sent to him by Mr. George Lawson from the Royal Ophthalmic Hospital, Moorfields, July 23rd, 1886, suffering from diplopia. He seemed to see clouds of smut before both eyes, and there was a good deal of localised pain in the left frontal prominence. Dental irritation being suspected, an examination was made, when the second upper molar was discovered to have a large distal cavity, and the wisdom tooth a small mesial cavity, which did not involve the pulp. Seeing an exposed pulp in the molar, he extracted that tooth and stopped the wisdom tooth with gutta-percha, when the patient became free from pain, but the ophthalmic trouble did not disappear until some time afterwards. He also took the opportunity of showing a modification of mirror for buccal cavities. They were all aware that with the mirror on the angular side the handle got thrown across the mouth and in the way of the work a good deal. He thought it a great advantage if the mirror

were put on the opposite of the plane. The handle was by this means thrown out of the way, and the operator was better able to hold the lip down.

Mr. HUTCHINSON, commenting on the case of dental irritation, said that he was inclined to doubt the advisability of stopping the wisdom tooth with gutta-percha. It was just possible a slight amount of irritation was still going on, and might account in some measure for the long continuance of the motor symptoms. He mentioned the matter because, in his own case, he was persuaded to have a molar in which there was an amalgam filling, and when it was afterwards extracted it was discovered that there was the slightest possible exposure of pulp.

Mr. HERN said the cavity was very small, and situated in the front portion of the crown; it was very shallow, and he could not imagine that there was any pulp involved. Nevertheless, the case being still under his care, he would bear the suggestion in mind.

Mr. PEDLY related a case bearing on the subject which came under his notice about a fortnight previously, and which had its comical side. A patient came to him with intense pain in one eye, accompanied with loss of vision. He came to the conclusion that it came from a broken-down upper molar tooth; this was extracted, and the patient returned a few days after, saying the pain was much better. The comical aspect was that when she was sent on to the ophthalmic surgeon, who after vainly trying innumerable glasses, placed before her good eye a very powerful lens. With this she read small print at a considerable distance. It was then quite clear that her supposed loss of vision was imaginary, and what seemed at first to be a case of amaurosis, due to dental irritation, turned out to be one of hysteria or downright malingering.

Mr. HUNT said, with regard to the relation between cause and effect, they must all be aware, from student experience, that ophthalmic troubles did come from bad teeth, and that these troubles did disappear upon the removal of bad roots. That benefit always followed the removal of bad roots he was not prepared to contend, but he thought that the *post hoc* and *propter hoc* were not so very disconnected. There was one other remark he had to make, and that was with regard to the paralysis of the seventh nerve. He had had three or four cases. They did not occur often in his practice, but in those three cases distinct and permanent benefit had been obtained by the removal of bad roots

on the same side that the motor trouble existed. He should like to ask if any members had had similar cases? They often heard of the irritation of the fifth nerve—their *bête noir*,—and he should very much like to know whether any present had had any experience with regard to the seventh nerve?

Mr. F. J. BENNETT regretted detaining the Society any longer on the casual communication, but it seemed of such interest, and there was so much divided opinion upon it, that he should like to hear a little more. Mr. Hunt had just told them that lesions of the eye constantly occurred from bad roots, but he should be glad if Mr. Hunt would give them a percentage of the cases which he thought had occurred. He would call the attention of the Society to a case which occurred at the London Dental Hospital more than ten years ago. The upper right central tooth of a young girl was pivoted; the tooth which had been fractured was filed smooth and the nerve removed. In dressing the tooth there was a good deal of pain in passing the instrument up to the apex, and he did not doubt for a moment that the instrument passed through the apex. When the patient came again, she complained of a good deal of pain in the eye. She was sent to Middlesex Hospital and examined by Mr. Lawson, and it was pronounced a case of iritis. The tooth was removed, but the girl did not get well at once, although she certainly did ultimately. What he wished to point out was that they usually had deferred to the opinion of the specialist on the eye; and in the case to which he had referred, it was clearly one in which they could not be supposed to have so much experience as the ophthalmic surgeons. He deprecated their taking upon themselves to question the soundness of the opinion of a specialist in a specialty not their own.

Mr. HERN: Some doubts had been thrown on the relation between cause and effect in these cases, but in this case he simply emphasised the fact that it had been seen by one of the best ophthalmic surgeons of the day; beyond that there were a great number of cases which went to prove the relation. In reading some time ago he noticed that Sir Thomas Watson spoke of paralysis in the teeth of children, and Mr. Salter spoke of paralysis of the muscles of the arm; then they had the able paper of Mr. Power about a year ago.

Dr. WALKER said he had seen Mr. Power that very afternoon, and he instanced eight cases arising from dental irritation which

had recently come under his notice, which he (Dr. Walker) thought went to confirm what had been said by Mr. Hern and Mr. Hunt. Dr. Walker also, referring to the speculum mentioned by Mr. Hern, described one with a cup and ball socket which he had used for fifteen years.

Mr. WALTER H. COFFIN mentioned that his father thirty years ago, for a similar purpose, had a double-faced mirror.

Mr. HUNT showed a mirror which he had used for about twelve years. The shank was of pure silver, and he could therefore bend it to any angle.

Dr. REDMAN gave an account of a case brought to him for treatment. The patient, a young girl aged about twenty-two or twenty-three, had a bad abscess at the angle of the jaw, opening on to the cheek, which was discharging freely, accompanied by almost complete closure of the mouth. He found she had an impacted wisdom tooth, and that it was impossible to extract it without extracting the twelve-year-old molar also. He accordingly extracted both, and the abscess was relieved. The opening closed in a very short time, but unfortunately from the time the abscess closed severe neuralgia set in, caused, he believed, by the implication of a branch of the fifth nerve in the cicatrix. Dr. Redman also showed a curiously-formed deciduous central tooth.

Mr. HUNT gave a casual communication with regard to the effect cotton wool had in separating the teeth. He supposed all would be familiar with the way in which ordinary cotton wool would separate teeth to almost any extent. Whether there was anything peculiar in cotton wool he was unable to say, but he remembered seeing a patient from a long distance who had two molars very much diseased. He, however, refused to have them extracted, and Mr. Hunt suggested a little cotton wool steeped in Eau de Cologne to relieve the pain. The patient came to him again some time after and the teeth were then comfortable, but were so far apart that he could put his thumb in the space between the two molars. Mr. Hunt also showed a model of the jaw of a lady aged forty. She had a full set of artificial teeth in the upper jaw, and in the under jaw she had a plate carrying all except the six front teeth, which had been made in America. She had been two or three years in England when she wanted the plate refitted, but was not aware it could be done in this country. Her reason for wishing this done was that the plate pinched her. Being somewhat ingenious, she

placed a piece of cotton wool where she felt the pressure and enlarged it from time to time. Curiously enough, the whole alveolus of the jaw sank under the long-continued pressure. So far as he knew, her health was in every respect good, and the alveolar process in the upper jaw was large, healthy, and well developed.

The PRESIDENT, in remarking upon the communication, said he was reminded of a case of separation of the teeth which came under his notice the previous year, and which was caused by the use of white gutta-percha, which the patient added to as the space became larger. This case illustrated the truth of the old adage, "He who becomes his own doctor has a fool for his patient."

Dr. GEO. CUNNINGHAM showed an appliance, for which he was at a loss to find a suitable name. The apparatus had been made by M. Rosenthal, of Liège, for the purpose of replacing part of the jaw (the body of the lower maxilla posterior to the second bicuspid, including the ascending ramus and condyle) of a patient, resected for sarcomatous tumour. The operation was performed by Professor von Winivarter, of the University of Liège, and consisted of an incision behind the ear along the line of the ascending ramus and condyle down to the basal angle of the jaw. The first models were taken two months after the operation. No precaution had been taken to prevent a contraction of the cicatricial tissue. After the operation the jaw on the opposite side became dislocated, and all efforts to replace articulation failed. It was then decided to put the patient under chloroform, when the jaw was held in place and the appliance fixed. Fearing the friction of the apparatus, M. Rosenthal instructed the patient to eat, which she did, even before leaving the couch on which she had had chloroform administered, and found no inconvenience whatever. Some months later she wrote that the appliance answered well, and she could eat solid food without difficulty. M. Rosenthal believed that a well-fitting appliance, immovably fixed in a clean mouth, would last ten or twelve years without damaging the teeth which support it. He reported that he had since seen the patient, who was enjoying good health. The gums were pink and healthy; the teeth maintained the appliance firmly, and were as solid as the others. There was no traction in moving the jaw. Dr. Cunningham had suggested to M. Rosenthal the advisability of distributing the strain of the appliance on the two teeth in each jaw by enlarging the plates to the fullest extent, and for cleanliness and preserva-

tion of the teeth encapsuling several of them with the plates and fixing them in position with pyrophosphate cement. M. Rosenthal thought the plan good where the saliva could be controlled and where it was not necessary to anæsthetize the patient each time of renewal.

NATIONAL DENTAL COLLEGE.

THE Annual Dinner of the Past and Present Students of the National Dental College was held on the 3rd December, at the Holborn Restaurant—the Dean, Mr. THOMAS GADDES, in the chair, who was supported by 75 guests.

After the dinner, the toast of “The Queen and Royal Family” having been duly honoured,

Mr. HENRI WEISS proposed “The Dental Societies.” He had much pleasure in proposing the toast, and felt sure it would be acknowledged with enthusiasm. The objects of the Odontological and Odonto-Chirurgical Societies were, as they all knew, the encouragement of investigation and research, and for mutual intercourse; whereas the British Dental Association looked after the ethics of the profession, and, being a young profession, of course they very well knew it required a good deal of looking after.

Mr. WILLOUGHBY WEISS, in responding on behalf of the Odontological Society, said: There was a saying with which they would all be familiar, about the sublime and the ridiculous; and when they had been promised a speech from Mr. Charters White, the President of the Odontological Society, and had to accept, as a substitute, one from the smallest of its officers, not only in size, but also in position, that saying found a fit illustration. He was speaking not only in place of the President of their noble Society, but also in place of one of their best Presidents. They would, therefore, understand his nervousness. He urged those gentlemen who were present, and who were not yet members of the Society, to become members. The Odontological Society was for the encouragement of enquiry and the dissemination of truth, and those dentists who did not mix with their fellow-practitioners could not keep pace with the important subjects and discoveries relating to their profession. In conclusion, he thanked them on behalf of the Odontological Society for the way in which they had received the toast.

Mr. J. SMITH TURNER (who was received with cheers) said: They were all aware that societies were formed for various purposes—some for instruction, some for defence, some for aggression,—but he thought they might eliminate the aggressive feature from their societies. He was requested, in the absence of the President of the Odonto-Chirurgical Society (Mr. Bowman Macleod) to thank them for the way in which they had received the name of that Society. With regard to the British Dental Association, it would endeavour, as far as it could, to remove the evils attaching to the profession. The Society was criticised more for what it did not do than what it did do; but it was desirable to proceed with all due caution. However, he thought the executive was industrious as well as cautious. The Association had stopped a large number of irregular practitioners without prosecutions; they had succeeded in inducing the Medical Council to strike off the register the names of those who had been put there under false representations. He would tell them that two members of the representative board had spent a whole winter's day in looking after the facts of one case before taking the responsibility of laying it before the Medical Council. It would, therefore, be seen that the Association was both cautious and industrious; and he thanked them in its name, and in his own, for the way in which they had received the toast.

Mr. Alderman RYMER, J.P., briefly proposed "The Staff." He alluded to the up-hill work and the difficulties the Institution had experienced in the past, and referred to the fact that it had always been exceptionally happy in having a good Staff. He had great pleasure in proposing "The Staff of the Hospital," coupling with the toast the name of Mr. Harry Rose. (Cheers.)

Mr. HARRY ROSE, in a few words, expressed his thanks on behalf of the Staff for the manner in which the toast had been received, adding that the Staff of the National Dental Hospital endeavoured to do all that they could to further the cause of the profession, the welfare of the students, and to maintain and increase the reputation of the Institution.

Mr. ARTHUR UNDERWOOD proposed "The Medical and Dental Schools." This was a toast which should be very acceptable to them all, for there could never be any division between the medical and dental schools. They, as dentists, claimed them both as their *alma mater*; they were educated at both a medical and a

dental school, and they went to take their diploma at surgical Colleges; both were inextricably mixed, and he hoped they always would be in the future. He had also to remember that, in connection with the toast, he had to associate the names of two gentlemen who had fortunately made their names so familiar to the whole profession that he need hardly do more than mention their names. The affectionate respect with which Mr. Pearce Gould (loud cheers) was regarded was not peculiar to Middlesex men alone; his name was sufficient to speak for itself, and did not require any treatment from him. He had expected also to mention the name of Dr. St. George Elliott, but he was, unfortunately, not able to be present. He had, therefore, to mention a name not less well known—that of Dr. Geo. Cunningham, of Cambridge. Dr. Cunningham was peculiarly situated with regard to the medical and dental schools, for, with an energy to be admired, he had already made considerable strides with a scheme for dental education in the University of Cambridge. (Cheers.) He had struggled hard, but he had won his laurels very soon; for he had already induced the University authorities to make arrangements for classes and lectures on dentistry. Dr. Cunningham was also engaged in a very great crusade, in which he had been preceded by Mr. Fisher—a crusade which would end in placing all schools under special supervision of a dental surgeon. This was a question of great importance, both to themselves as a professional body and also for the public. It was impossible to sufficiently enlarge upon it at such a moment as that. Nothing could be more important than that the public—and especially the rising generation—should have a proper supervision in their own specialty, and it would not be until the labours of Mr. Fisher and Dr. Cunningham were crowned with success that the British public would be in perfect health and happiness. In conclusion, he begged to give them, “The Medical and Dental Schools,” associating with the toast the names of Mr. Pearce Gould and Dr. Cunningham.

Mr. PEARCE GOULD said: The medical schools of London were passing through some critical times. They were all aware of the many important questions which were agitating the schools of London in every direction. There was no doubt whatever that much had been done in the immediately preceding years to improve the position of the London medical schools, though in the next few years they would see fresh strides to make them more

efficient than they even were at present. He believed they never were so efficient as at the present time; the teaching done in them was never so well conducted as at the present moment; but he was not there to speak of them as perfect, or anything like perfect. Happily, they belonged to a profession which was ever progressing. None of them would think they had attained the zenith of their profession, but they all wished to make fresh strides in the cause of truth and science. With respect to the very kind reference that had been made to the close association of the medical and dental schools, for his own part he would say that the dental students were very welcome indeed at all the medical schools in London, and if there was any complaint that the staff of the medical schools had to make of the dental students it was that they stayed only a very short time; they (the staff) regretted that they had to leave them so soon. Being somewhat closely associated with Middlesex Hospital, he (the Dean) could not forget that that Hospital had a very intimate connection with the dental schools of London. For some years a large proportion of the dental students of London attended the Middlesex Hospital; of later years they had been more widely distributed. They had on their Staff two names which would ever be held in high honour—Sir John Tomes and Mr. Smith Turner. So long as they had the names of those two gentlemen, or either of them, on their Staff, it was impossible to be anything but proud of their close association with the dental profession.

Dr. CUNNINGHAM gave a short account of his exertions in connection with the University of Cambridge; what had already been accomplished, and what they hoped to do in the future. At present they had not done a very great deal, but he hoped in a few months to see a considerable development. At the present moment he had a class in the University, several of whom were anxious to take part in clinical instruction, and as dressers, should the opportunity occur. And when they remembered that the medical man was their first dentist, they would agree with him that it was of the highest importance that some dental instruction should form part of his professional education. After referring with satisfaction to the sympathetic terms in which so important a member of the medical profession as the previous speaker had dwelt upon the connection between the medical and dental professions, and expressing his regret at the absence of Dr. W. St.

Geo. Elliott, of whom he spoke as "the man of many wrinkles," Dr. Cunningham concluded by thanking them for the hearty reception they had accorded to the toast.

The CHAIRMAN, in proposing the toast of the evening, said: He had the pleasure to propose a toast which he was sure would meet with very general approbation, viz., "Success to the Past and Present Students of the National Dental Hospital and College." (Cheers.) The dental student, as, of course, every dental student well knew, was a very important factor in the working of a dental hospital; indeed, it could not be carried on without the students. And they must be very good fellows, if only because they had submitted to no fewer than 300 lectures by himself; that alone, he thought, a very severe test, an ordeal which bore testimony to the good nature of the dental student. Among their past students there were many practitioners who, without any egotism, might be said to be fully equipped for any emergency. As operators there were some of their past students who, he was quite sure, would stand second to none. He was confident that it would be gratifying to those present to know that among their past students there were some who were now themselves teachers in special dental schools, and who were reflecting considerable lustre upon their dental *alma mater*. Referring to the present students, he said they had much to do to keep up the *prestige* of the past students; and with regard to their maintaining that *prestige* he would remind them of the old adage, "Do not cry until you are through the wood." He would therefore refrain from too highly praising their present students. The Dean then referred with pleasure to the great success which attended the first smoking concert of the Students' Society, and continuing, said he would, for a brief moment, direct their attention to what he alluded to in proposing the royal toast, viz., Her Majesty's approaching jubilee. They found that every city and also the various professions, not excluding what the late Lord Shaftesbury called "the divine profession," were each and all striving to do something to commemorate the Queen's Jubilee.

Why should the dental profession be in the background? He would suggest that a very fitting commemoration, as far as the dental profession was concerned, would be the founding of a dental scholarship, which might be called "The Victorian Scholarship." He could think of nothing which would better stimulate dental education than a scholarship which should be open to

the competition of the Dental Students of the United Kingdom. But whether they adopted this or some other idea, at least, he hoped, that their profession would not be in the background in commemorating Her Majesty's jubilee. In conclusion, he asked them to drink to the toast of "Success to the Past and Present students," coupled with the names of Mr. Glassington and Mr. Phillips. (Cheers.)

Mr. CHAS. GLASSINGTON, in returning thanks for the past students, said: They must look back upon their students' days with mixed feelings of pleasure and regret; pleasure, because they must have done a great deal of interesting work during that time; regret, because they could not help thinking they might have done a great deal more. He disclaimed the title of past student for himself, for he found that every day he went up to the Hospital he learnt something more.

Mr. PHILLIPS, for the present students, said that their thanks were specially due to the Staff of the Hospital, more particularly to their worthy Dean (cheers), who was ever amongst the first to give them not only his advice, but practically to demonstrate upon any subject to any student who consulted him.

Mr. SCOTT THOMPSON said he had now the pleasure of giving them the toast of the health of their worthy Chairman, Mr. Gaddes. (Great enthusiasm.) It was not necessary for him to say much about Mr. Gaddes, and, indeed, words would fail to tell all they felt about him. Whether they regarded him as one who had attained the foremost ranks of the profession by sheer hard work, or whether they regarded him as the Dean of their School—and they all knew how much depended upon the energy and tact of the Dean—the "National Dentals" all felt that they owed a great debt of gratitude to Mr. Gaddes.

The toast was drank with musical honours and with much enthusiasm.

Mr. GADDES, in briefly replying, assured them that so long as they would accept them, his best labours would be for the students of the National Dental College. (Cheers.)

The official programme being concluded, upon the invitation of the Chairman, songs and recitations followed, which terminated the proceedings.

ON THE POSITIONS AND RELATIONS OF THE TEETH IN CHILDREN.

Being a Paper read before the Odonto-Chirurgical Society,
by J. SYMINGTON, M.D., F.R.S.E.,

Lecturer on Anatomy, School of Medicine, Edinburgh.

ONE of the principal objects of this communication is to direct attention to a method of investigation which appears to have been almost entirely neglected in the examination of the relations of the teeth in children, but which has proved of great value in the study of the topographical anatomy of other organs of the body. I refer to the plan of freezing the parts we wish to examine, and then making sections with a fine saw. I hope to be able to demonstrate, from specimens prepared in this way, several interesting points in the topographical anatomy of the teeth and jaws that appear to have been hitherto overlooked.

The position of the permanent teeth before their eruption has been mainly investigated in the dried skull, the teeth being exposed by filing away the bone external to them. While specimens prepared in this way afford a connected view of all the teeth, they possess several obvious disadvantages. For instance, by the removal of the soft parts, some important relations of the teeth are lost. Again, there is considerable danger of those teeth that happen to be only partially calcified shifting their position, in consequence of the drying up of the soft pulp, and owing to the manipulative procedure adopted in exposing them. On the other hand, by freezing the undissected head, and cutting it up into thin slices while frozen, we retain the soft parts in their natural position, and obtain beautiful sections of the teeth, even though they are only slightly calcified. Such sections also show, much better than ordinary dissections, the relations of the teeth to the neighbouring cavities, and the relative positions of the teeth of the upper and lower jaws.

The first preparation I propose to describe is a transverse vertical (coronal) section of the head of a child about two months old (see Fig. 1), which is a life-sized drawing. In it the cavity of the mouth is represented by thick black lines, and the tongue, the mucous membrane of hard palate, and the gums are left white. The section, although essentially coronal, is slightly oblique from side to side, being a little further forward on the right side than on the left.

In this case the mouth was closed before the body was frozen, so that, as can be seen from the section, the dorsum of the tongue was in close contact with the palate, and the cavity of the mouth was merely potential. It will, however, be observed that the gums of the superior dental arch do not meet those of the lower, but are separated by a distance of 6 mm. The space between the gums, opposite the incisors, was about the same as at this level. Several

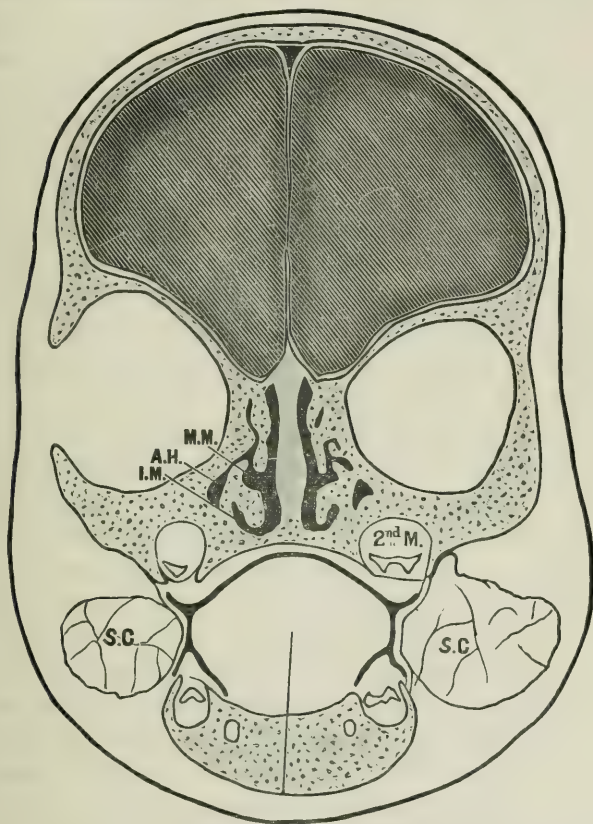


FIG. 1.

sections in my possession, from new-born children, show a corresponding separation between the two gums. In one case, that of an infant five days old, the head was flexed before the body was frozen, so that the chin was pressed against the front of the neck, and the mouth was thus firmly closed; yet the interval between the gums of the upper and lower jaws was nearly equal in extent to that seen in the child two months old. Infants of about these ages are probably able, by forcible contraction of the elevators of

the lower jaw, to bring the gums in apposition ; but these sections show that this does not occur under ordinary circumstances, even though the mouth is so closed that the tongue is in close contact with the palate. I have been unable to find any reference to these relations of the gums, but they are of interest, as they show that, owing to the shape of the jaws, provision exists at birth for a considerable development of the alveolar arches and teeth before the gums of the two jaws can readily meet.

If a vertical mesial section be made of the head of a new-born child, or of one a few months old, the cut edge of the gum of the lower jaw will be found lying in a plane posterior to that of the upper. On an average, the posterior alveolar plate of the upper jaw is opposite the anterior one of the lower jaw. In the coronal section of the child two months old, the second molars were divided in the upper jaw, and the first molars in the lower. This was not due to any obliquity of the section, but to the fact that the corresponding teeth in the two dental arches do not lie vertically opposite one another, those of the lower jaw being behind those of the upper.

At this age the maxillary sinuses are narrow from side to side, and do not extend outwards to any appreciable extent between the alveoli of the teeth and the orbits. In this infant each sinus measured about one-third of an inch from before backwards.

C. S. Tomes* describes the alveoli of the upper jaw in the new-born child as "separated only by a thin plate of bone from the orbits." In the child two months old this osseous wall opposite the second molars was 4 mm. thick. On examination it was found to consist of two layers of compact tissue, one belonging to the alveolus and the other to the orbit, while between them there was some cancellous tissue. In new-born children I have found the bone between the alveoli and orbits nearly as thick as in this child, so that the statement of Tomes is somewhat misleading.

This specimen affords a good example of the amount of fat that may be found in the cheeks. The distance, in the plane of this section, from the outer surface of one cheek to that of the other is about three inches, while that between the two buccinator muscles is little more than an inch, so that each cheek is nearly an inch in thickness. The cheek consists mainly of fat, and if this be examined it will be found to be divisible into two portions,

* A Manual of Dental Anatomy, 2nd Ed., 1882, p. 180.

one continuous with the ordinary subcutaneous fat, and another in the form of one or more lobules, surrounded by a clearly-defined capsule, so that it can be very easily shelled out. These lobules of fat (see Fig. 1, s. c) have been called "sucking cushions," as it is believed that they serve an important function in the act of sucking, for they tend to distribute the atmospheric pressure and prevent the buccinator muscles being pressed inwards between the alveolar arches when the vacuum is created in the mouth.

It is maintained by H. Ranke,* who has very carefully investigated these lobules of fat, that they exist at all periods of life, but are best marked in infants. He also asserts that in emaciated children they are only slightly diminished in size, although the general subcutaneous fatty layer be almost entirely removed.

With the exception of the canines, the crypts of those teeth of the permanent set that afterwards take the place of the milk teeth—viz., the incisors, canines, and bicuspid—do not call for special notice. The peculiar position of the canines before their eruption is seen in two of my coronal sections, one obtained from a girl six years old, and another from a girl nine years old. In the first, only one of the first permanent molars—viz., the left inferior—had erupted, although the corresponding tooth on the right side was nearly through the gum. The second one had cut all her permanent incisors, but the first bicuspid had not appeared. In the former subject a section was made near the plane between the first and second upper temporary molars, the posterior part of the first temporary molars was destroyed by the saw, but the second temporary molars escaped injury. The anterior of the two surfaces exposed by this cut showed the first bicuspid, and the posterior one the second bicuspid. The posterior parts of the first bicuspid, like those of the first molars, were removed, but the second bicuspid were not touched, except a small part of the left one. The bicuspid were, therefore, vertically above their corresponding temporary molars. The principal interest of this section, however, is the view it affords of the upper canines. These are seen in the anterior part of the section lying above and internal to the first bicuspid, and close to the inferior meatuses of the nose. The crowns of the canines, which were well developed, were directed outwards and forwards. On examination, the septum between

* Ein Saugpolster in der Menschlichen Backe. Virch. Arch. Bd. XCVII. 1884, p. 527.

the crypts of the canines and the first bicuspid was found to be incomplete, the two crypts communicating by a small aperture.

In the girl aged nine years, a section was made which closely agrees in its position, and in the teeth exposed, with that just described. Thus the anterior part of the section (see Fig. 2) presents a view of the first left temporary molar, which was partly decayed; above and internal to it lay the first bicupsid, while still higher up and more internal, the canine. The section was a little farther back on the right side, and there a small opening was made by the saw into the crypt of the canine, but this tooth was not cut.

The crypts of the permanent lateral incisors and of the first

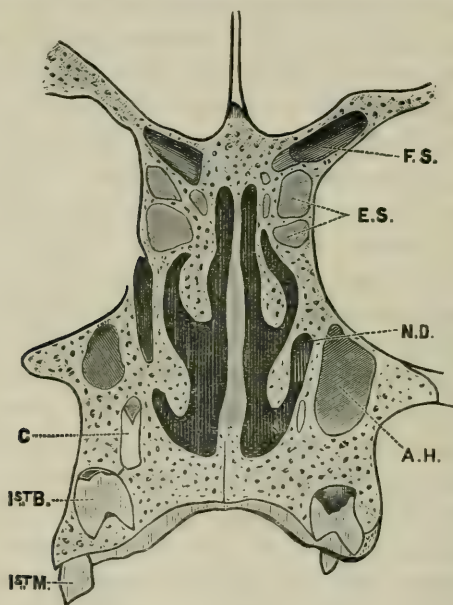


FIG. 2.

bicuspid are separated simply by a bony septum, for the canines are placed on a plane above them. It is needless for me, in a Society of Dental Surgeons, to dwell upon the points of practical interest connected with this peculiar position of the crypts of the permanent canines in relation to those of the other teeth, but I would direct your attention to the admirable view that is obtained from these sections of the relation of the canines to the nasal cavity, the antrum of Highmore, and the nasal duct. In the girl nine years old (see Fig. 2), the canines were near the outer walls of the

inferior meatuses of the nose, especially as can be seen on the right side of the section, near their posterior part. In the other girl, the canines were nearer the middle line, and consequently below the floor of the nose. From the position of their crypts, these canines might be more appropriately called nasal than eye teeth. In both the subjects, the antrum of Highmore was opened by the sections exposing the canines, and its cavity was found to extend forward fully as far as those teeth. In these children the opening of the nasal duct into the nose corresponds to the plane of the posterior surface of the crypts of the permanent canines, while a line, prolonged downwards and backwards in the direction of the nasal duct, would reach the anterior surface of the first permanent molar.

Some of the most interesting points in relation to the growth of the jaws after birth are intimately connected with the development

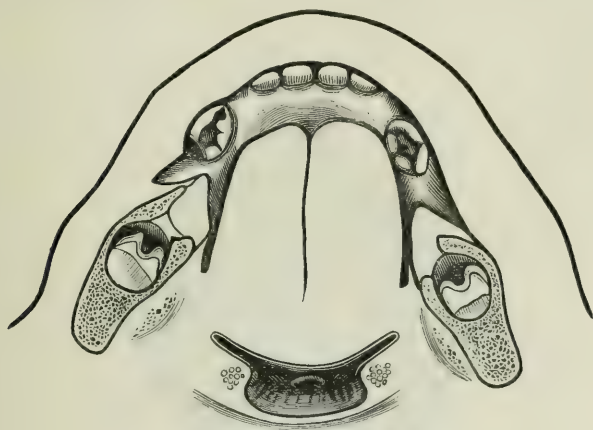


FIG. 3.

and eruption of the permanent molars; and since the publication by John Hunter of his classical work "On the Natural History of the Human Teeth," the process by which space is formed in the alveolar arches of the jaws for the permanent molars has been the subject of numerous investigations. J. Tomes,* in particular, describes very fully and accurately the conditions of the jaws and teeth in children of different ages, and confirmed and extended the observations of Hunter with regard to the peculiarities in the

* A System of Dental Surgery. 1859.

growth of the lower jaw. It appears to me, however, from a perusal of the literature of the subject, that but little attention has been directed to the relative position of the permanent molars of the upper and lower jaws before their eruption, and the changes in their position during their eruption; and I will now describe some sections in illustration of these points.

The specimens I shall first consider were obtained from a female child about fifteen months old, and they show the position of the first permanent molars in the upper and lower Jaws. In this subject, a horizontal section was made at the level of the mouth. All the temporary incisors and first molars had erupted, but none of them were divided, as the mouth was slightly opened, and the saw was carried backwards between the milk teeth of the upper and lower dental arches. Behind the alveolar arches, the ascending rami of the lower jaw were cut across, and the first permanent

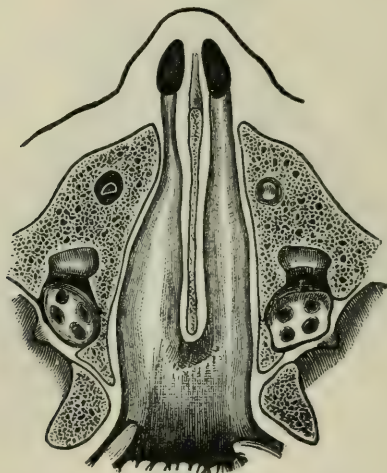


FIG. 4.

molars were exposed embedded in the basis of the coronoid processes. Fig. 3 was made from a life-sized drawing of the lower portion of this section.

Another horizontal section was made in this subject. It was a little above the level of the floor of the nose, and it opened the crypts of the first permanent upper molars (see Fig. 4). In this subject, the distance between the inner surfaces of the first temporary molars in the upper jaw was 21 mm., and between those in the

lower 20 mm.; so that the upper molars were a small fraction further apart than the lower.

It was very different, however, with regard to the first permanent molars, as can be readily seen from a comparison of the two sections (see Figs. 3 and 4). The upper permanent molars were 21 mm. from one another, and the lower ones 38 mm. The lower molars were not only external to the upper ones, but also posterior to them. Thus, in the lower jaw, the distance from the posterior surface of the crown of the first temporary to the anterior extremity of the first permanent molar was 11 mm., while the interval between the corresponding teeth in the upper jaw was only 6 mm.

The crowns of the upper molars were directed downwards and slightly backwards, and those of the lower molars forwards, inwards, and slightly upwards. At this period of life there is not room in the alveolar arches for the first molars, so that these are placed, the upper at the back of the tuberosity, and the lower in the base of the coronoid process.

The second molars begin to be developed about the seventh month after birth, but they remain for a long period very rudimentary, their calcification not commencing until about the fourth year. The section in this child above the level of the floor of the nose (see Fig. 4), exposed the germs of the second molars just posterior to the first molars.

We will now pass to the consideration of the appearances presented by some sections in children, a little before and during the period of eruption of the teeth of the second dentition.

In a boy about five years old, one sagittal section was made through the head about 2 cm. to the right, and another 3 cm. to the left of the mesial plane. The former cut (see Fig. 5, which shows the internal of the two surfaces exposed by this section) passed backwards just outside the angle of the mouth and external to the crowns of all the milk teeth, with the exception of the second upper molar, the outer surface of which was just grazed by the saw. Two fangs of the second upper temporary molars and one fang belonging to the corresponding lower molar, were divided. This child had a very good set of milk teeth, and the upper temporary molars had their normal relation to the lower, as they extended a little further out than the latter. Behind the

milk teeth, the first and second permanent molars were divided in the upper jaw, and the first permanent molar in the lower one.

The left sagittal section was more external than the right one, being about 3 cm. from the mesial plane. It was several millimetres external to the upper permanent molars, but divided the first and second lower permanent molars.

The preparations obtained by these sections demonstrate that the first permanent molars are not vertically opposite one another, and, indeed, they showed that but slight progress had been made towards this position, as compared with their relative situation in the infant fifteen months old.

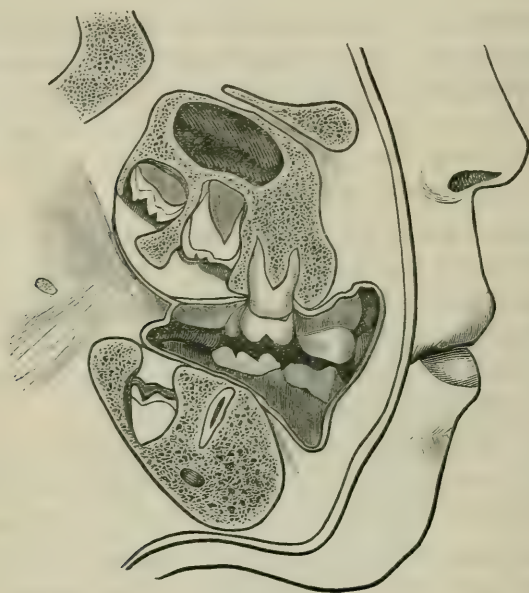


FIG. 5.

In the latter subject, a section might have been made which would have just shaved the external surface of the first upper molar and the internal surface of the lower; while, in the right sagittal section in the boy (see Fig. 5), the first upper permanent molar had its outer surface shaved off, and the first lower permanent molar was divided near its inner surface. The upper molar did not project to any appreciable extent externally to the milk tooth in front of it, while, in the lower jaw, the permanent

molar was situated almost entirely external to the plane of the outer surface of the second temporary molar.

It is worthy of note that the gums formed a distinct ridge directly behind the milk teeth in each jaw, and that, while the upper molars were almost directly above the gums, the lower molars were below and external to them.

In the girl aged six years, already referred to, a coronal section of the head was made at the level of the first permanent molars, all of these teeth being divided. As previously mentioned, the left inferior molar had erupted, and the right inferior was nearly through the gum, but the upper molars were still a short distance from the surface. The lower molars were a little external to those

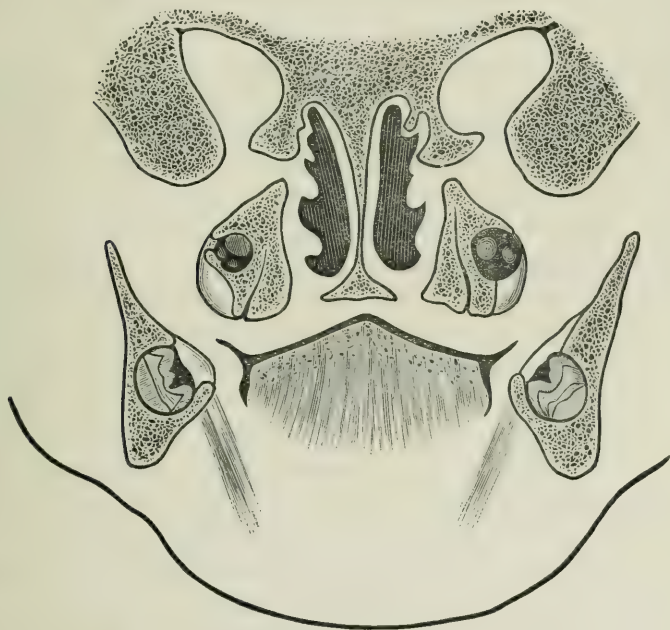


FIG. 6.

of the upper jaw, but as the former inclined inwards, they would have gained their normal adult relations to the upper ones by the time that the teeth would have come in contact, had the child lived.

In a similar section in the girl nine years old, all the first permanent molars were divided, but rather nearer their posterior

surface than in the former subject. These teeth met so that the external cusps of the lower molars were between the internal and external cusps of the upper molars. In the upper jaw, the second molars were also divided, while, in the inferior maxilla, there were no traces of the corresponding teeth. The second upper molars were cut near their anterior surface, and the specimen illustrates the fact that these teeth tend to overlap the first molars.

In each of these girls, another section was made behind that exposing the first molars. In the girl six years old, it divided the second lower molars, which were embedded in the anterior part of the bases of the coronoid processes, but the section passed behind the second upper molars. The crypts of these teeth were, however, opened, and on the left side a small piece was shaved off the posterior part of the crown of the upper tooth (see Fig. 6, which shows the anterior of the two surfaces exposed by this section).

The section in the girl nine years old differed from that just described, for it passed completely behind the tuberosities of the superior maxilla. The second lower molars were divided rather nearer their posterior than their anterior surfaces, and, as in the girl six years old, they were situated in the bases of the coronoid processes. The tuberosity of the upper jaw was afterwards exposed by the removal of some fat and cellular tissue from the anterior of the two preparations obtained by this section. The wisdom tooth was found lodged in a recess at the back of the tuberosity. It was in a rudimentary condition, as, although the tips of its cusps were calcified, they were not all united together; indeed, this tooth was scarcely so well developed as in the second temporary molar at birth.

In this paper, specimens have been described in which the first permanent molars were exposed and their positions determined in an infant fifteen months old (see Figs. 3 and 4), in boy five years old (see Fig. 5), and in two girls, aged respectively six and nine years. From these preparations, it is evident that the relative position of these teeth in the upper and lower jaws before eruption is the reverse of that which they occupy after they cut the gum and the crowns come in contact. Before eruption, the first upper molars lie much nearer the mesial plane, and also further forwards, than the lower ones; while, after they come in contact, the crowns of the upper molars extend a little further

outwards and backwards than those of the lower. Unfortunately my specimens do not illustrate so completely the relative positions of the second and third molars; still, there can be little doubt but that they undergo similar changes in position. Thus, in the boy five years old and in the girls six and nine years of age, the relative position of the second molars of the two jaws is very similar to that of the first molars in the infant fifteen months old.

The question now arises as to how the permanent upper and lower molars alter their respective positions, so that in place of the upper ones being distinctly anterior and internal to the lower, they become slightly external and posterior. Is it by a difference in the growth of the two jaws by which the teeth are brought vertically above one another, or is it to be attributed to a difference in the direction taken by the teeth during their progress towards one another?

There are several differences in the condition of the two jaws that might lead us to suspect that, during their growth, the posterior part of the alveolar arches may extend outwards and backwards more rapidly in the upper than in the lower jaw. In the upper jaw, the alveoli for the permanent molars are formed from the lower and back part of the tuberosity, while, in the lower jaw, there must be an absorption of the anterior part of the ascending ramus before space can be formed for these teeth. Again, the suture between the two halves of the lower jaw is obliterated by the end of the first year after birth, so that increase in the breadth of the jaws can only occur by deposition on their outer surface and absorption on the inner; while, in the upper jaw, the suture between the superior maxillæ persists during the whole period of life, and consequently the superior alveolar arch can increase in breadth by new formation of bone at the inner edge of the palatine process as well as on the outer surface of the alveolar arch.

According to C. S. Tomes,* the distance between the inner alveolar plates at the level of the junction of the first and second temporary molars is practically the same in an infant eight months old as the corresponding points are in an adult.

From my own limited observations, I should feel inclined to believe that the growth of the lower jaw is accompanied by some increase in the space between the inner alveolar plates, but that it

* Op. Cit., p. 185.

is probably a little more marked in the upper jaw than in the lower. I believe, however, that it is mainly owing to the differences in the direction of the upper and lower molars that the relative position of these teeth is altered. It will be evident from an examination of the sections of the first lower molars in the child fifteen months old (see Fig. 3), and of the second molars in the girl six years old (see Fig. 6), that these teeth have a decided inclination inwards and forwards. On the other hand, however, the upper molars exhibit a tendency to point outwards and backwards. This difference in direction is very obvious, even in the adult skull.

It is well known that the outer alveolar plates of the lower molars are much thicker than the inner ones, while the reverse is the case with those of the upper molars. If the lower permanent molars be examined by looking vertically down upon them, the inner part of their crowns will be found to overhang their internal alveolar plates, so that the latter are concealed from view; while a similar examination of the crowns of the upper molars reveals a tendency of the outer parts of the crowns to bulge beyond the level of the outer alveolar plates. As the opposing molars have a considerable distance to travel, during their eruption, before their crowns can meet, the differences in their course must give rise to a marked alteration in their relative position.

The opinion, that it is rather the differences in the direction of the teeth than in the growth of the jaws, that account for the alteration in the position of these teeth, is supported by the examination of the sections of the boy five years of age and of the girl six years old. We have seen that, in the boy, the differences in the position of the upper and lower first molars are nearly as marked as in the child fifteen months old. During this period, the jaws have been gradually altering to make room in the alveolar arches for the first molars, and these teeth have been increasing in size, but they have not, as yet, made much advance towards one another. Again, in the girl six years old, the lower molars are still a little external to the upper ones, but their relative inclination is such, that by the time their crowns come in contact, they have gained their normal relation to one another.

Editorial.

THE QUEEN'S JUBILEE.

DURING this year, 1887, will Her Majesty have reigned for fifty years. In the history of the monarchy of England this is only the fourth instance of a Sovereign wearing the sceptre for that period. The event of Her Majesty's Jubilee is to be very widely and variously celebrated,—both by passive pleasures and more lasting memorials. The nation, as a whole, will establish an Imperial Institute. Almost every town of importance is preparing its special tribute. The Church is about to found its House of Assembly. The Medical Profession is in possession of certain proposals. In the face of all this, why should not the Dental Profession have a scheme of its own for commemorating the great event? Within the past three years the Specialty has received from Her Majesty unprecedented honours—honours conferred upon two esteemed representative men. Not simply in recognition of these highly appreciated acts of grace, but also to mark the affection of the Profession for the Sovereign and its sympathy with this great jubilee, is it desirable that the Dental Profession of the United Kingdom should unite in commemorating the jubilee of Her Majesty's happy and prosperous reign?

To do this in a fitting, serviceable and lasting manner, we would suggest the founding of a VICTORIAN SCHOLARSHIP, open for competition to Dental Students of the United Kingdom. The examination should be in the several subjects of dental education, and be open to all registered students who had, within a certain period, either completed the curriculum or taken the L.D.S. qualification. By subscriptions from the profession at large, sufficient money could be got together, the interest from which would form the annual exhibition to the most successful competitor. £600 at 4 per cent. would realise £24 per annum. There ought not to be any difficulty in raising that, or even a larger sum, considering

the happy and altogether exceptional circumstances of the case and the beneficial use to which the money would in that way be applied.

To commemorate Her Majesty's Jubilee in some such manner as that here mentioned would stimulate a healthy rivalry between the several Dental Schools, and thus tend to improve dental education and spur on the ambitious for the highest honours.

ANSWERS TO CORRESPONDENTS.

H. CLAY.—Celluloid is made from the cellulose of hemp, acted upon by nitric acid, and mixed with camphor. It was an American patent, having been invented by Hyatt in 1869. That now used for dental purposes is of American manufacture.

A. Y.—The College authorities alone can reply to your questions.

GOSSIP.

THE next examination for the L.D.S. will be held on Feb. 21st and following days.

THE *Lancet* remarks that one, and not the least forcible, lesson of the Campbell case is that which we have so often tried to teach in these columns—that medical practitioners act wisely when they do not make friends of their patients, but treat their friends strictly professionally. The several relationships of *friend* and *medical adviser* are not socially compatible. The one position ought to be abandoned when the other is assumed. It is in the confusion of the two characters that difficulty and scandal take their rise.

MR. PREECE, of the Post Office, while acknowledging the telephone to be in many respects superior to the telegraph, says that the former could not entirely supersede the latter, as at the present time the Wheatstone automatic apparatus could transmit 400 words a minute between London and Liverpool.

IN connection with the Dental Hospital of London Medical School, an Athletic Club has been formed, to include Cricket, Football, and Lawn Tennis.

WITH reference to the anti-vivisection craze, Sir William Stokes, President of the Royal College of Surgeons in Ireland, in a recent address on the "Finality of Surgery," said that there is the present epidemic of that combined hysteria, sentimentalism, and folly which has done so much to mar the intelligence and sap the judgment of so many men, as well as women, and which has resulted in the State placing cruel and senseless fetters on those whose aim and lifework have no objects but the advancement of our science and the welfare of mankind.

MR. W. F. CLARKE, a Canadian, says he is convinced that the most important office of the bee's sting is that which is performed in doing the artistic cell work, capping the comb, and injecting the formic acid by means of which honey receives its keeping qualities. The sting is really a skilfully contrived little trowel, with which the bee finishes off and caps the cells when they are filled brimful of honey. This explains why honey extracted before it is capped over does not keep well. The formic acid has not been injected into it. This is done in the very act of putting the last touches on the cell work. As the little pliant trowel is worked to and fro with such dexterity, the darts, of which there are two, pierce the plastic cell surface, and leave in the nectar beneath it tiny drops of the fluid which makes it keep well.

ADVERTISING in connection with dental practice is not a modern innovation, for in an Almanac and Pocket-book, bearing the date 1708, "Made and Compiled for his Country's Benefit by Cardanus Riders," appears the following advertisement:—"Artificial Teeth set in so well, as to eat with them, and not to be discovered from Natural; nor to be taken out at Night, as is by some falsly Suggested, but may be worn years together; they are an Ornament to the Mouth, and helps the Speech; also Teeth Cleaned and Drawn by John Watts, Operator, who applys himself wholly to the said Business; he lives in Raquet-Court, in Fleet street."

At the Royal Society, on November 25th, a paper by Sir Richard Owen, F.R.S., was read, of which the subject was a fossil lower jaw of the large extinct marsupial quadruped which the author, from previous fragmentary specimens, had referred to a carnivorous pouched species of the size of a lion, to which was assigned the generic name *Thyacoleo*, and the probable prey of which had been the larger forms of herbivorous marsupials, which, with their destroyer, had become extinct.

IN a lecture delivered at the Royal Institution, on June 4th, 1886, on the Sympathetic Nervous System, by Dr. Walter H. Gaskell, M.A., F.R.S., the lecturer said he hoped to give the death-blow to Bichat's teaching, of the division of life into organic and animal life, and to prove that the whole sympathetic system is nothing more than an outflow of visceral nerves from certain nerve-centres in the cerebro-spinal system, the ganglia of which are not confined to one fixed position, as is the case with the ganglia of the posterior roots, but have travelled further away from the central axis. He dealt entirely with the anatomical argument, and showed step by step how the nerve-fibres which constitute the sympathetic system can be traced to their origin in the central cerebro-spinal axis. In this connection the following conclusions were arrived at:—

(1.) The sympathetic does not send non-medullated fibres into the cerebro-spinal system, because these fibres all pass out of the nerve-roots before they reach the spinal cord.

(2.) White or medullated nerve-fibres constitute the only link between the sympathetic and cerebro-spinal systems, constituting the white rami communicantes.

(3.) Consequently the connection between these two nervous systems is limited to the region of white rami communicantes, *i.e.* to the region between the second thoracic and second lumbar nerves.

So that we find for the muscles of the face a distinct separation of two groups, viz. (1) those which move the eyes and the tongue—these are supplied by nerves which arise from the continuation of the anterior horns; and (2) the muscles of expression and mastication, the nerves of which arise from the continuation of the lateral horn; and remembering how the smile, the laugh, and the snarl, as well as the action of swallowing, are at the bottom

only modified respiratory movements, we see that Charles Bell was not so far wrong when he inserted a lateral or respiratory system of nerves in between the anterior and posterior roots.

ON Monday evening, November 8th, an Ordinary Meeting of the Edinburgh Dental Students' Society was held in the Hospital, 30, Chambers Street, Mr. T. Stewart Durward, the President, in the chair. Mr. Alexander Cormack, one of the honorary presidents, delivered an inaugural address, and Mr. James G. Munro read an illustrated and most practical paper, entitled "Continuous Gum Work."

At a meeting of the Fellows of the Royal College of Physicians, held on December 23rd, the following resolution, moved by Dr. Broadbent and seconded by Sir W. Gull, was carried unanimously:—"That an application be made to the Crown by the Royal College of Physicians of London and the Royal College of Surgeons of England, acting conjointly, for power to confer degrees in Medicine and Surgery."

IN a series of Experiments on the Distribution of Micro-organisms in Air (by Hesse's method), by Dr. Percy F. Frankland, and Mr. T. G. Hart, a great number of experiments were performed on the roof of the Science Schools, South Kensington, and the average results obtained were as follows:—

1886	Average number of micro-organisms found in 10 litres of air by Hesse's method						
January	4
March	26
May	31
June	54
July	63
August	105
September	43
October	35

Experiments are also recorded showing the enormous increase in the number of micro-organisms present in the air of rooms consequent on crowding. In illustration of this point the authors cite a series of experiments made in the library of the Royal

Society during the evening of the *conversazione* in June last, when the following results were obtained :—

Royal Society's Library						Number of micro-organisms found in 10 litres of air.
June 9, 1886,	9.20 p.m.	...	...	...	...	326
"	10.5 "	...	...	...	...	432
June 10, 1886,	10.15 a.m.	...	...	...	...	130

ERRATUM.—At the commencement of the fourth paragraph on page 568, vol. vi., for " Mr. Rymer " read Mr. Moore.

THE Council of the Society of Arts are prepared to award two gold medals and four silver medals for prime movers suitable for electric-light installations. The medals will be awarded on the results of practical tests.

DURING 1884, 1,826 pipes of alcohol, having a value of £40,518, was made from the sweet potato in the Azores, and exported to Lisbon for fortifying wine. Subsequently, the production has increased, and is still increasing.

It has been our privilege, says the *Dental Review*, during the past few weeks, to remove cotton from the roots of teeth, over which fillings of gold or amalgam had been inserted. In every case an alveolar abscess had already been formed, or there was at the time an acute pericementitis, which would have resulted in an abscess. In a few of the cases seen, the cotton had been packed into the roots within a year or two. In all cases it had been soaked in creosote, carbolic acid, or a solution of chloride of zinc; and the odour, or other antiseptic property of the medicament, had in every instance disappeared. We presume the idea of the dentist in using cotton as a root filling is, primarily, ease of insertion; and he also entertains the hope that, by medicating it, that that will prevent the development of mephitic gases. Such a hope is not founded on a correct knowledge of the lasting property of an antiseptic. The porosity of the interior of a tooth alone is such that the antiseptic, whatever may be its potency, will in time be absorbed. The practice of incorporating fibres of cotton into plastic materials for filling roots is delusive and unreliable. Perfect homogeneity of the filling is never obtained, especially in thin or tortuous canals.

THE DENTAL RECORD.

VOL. VII.

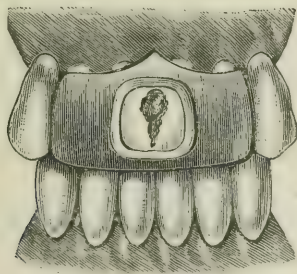
FEBRUARY 1, 1887.

No. 2.

THE ROWNEY MATRIX: AND ITS ADAPTATION TO THE PRODUCTION OF CONTOUR STOPPINGS IN THE INCISORS.

By THOMAS ROWNEY, L.D.S.Eng.

THE value of matrices in making contour stoppings in gold is well known to every operator, and their forms are so varied that there can scarcely be conceived a case in which they cannot be used in operating upon the molars and the bicuspid in interstitial cavities. It is when we come to interstitial cavities in the incisors and canines that we find there is a want which has never yet been met by any matrix extant. Every operator can recall cases where, in these teeth, especially the lingual as well as the labial surfaces have disappeared under the process of decay, and he is not likely to forget the labour and fatigue they cost him in



restoring their contour in the only material which can be counted on for many years of service. If he be of a sympathetic disposition, he cannot forget the tired condition of his patient and the sigh of relief which followed the announcement, "The operation is finished."

It was to meet the wants of a case in which the median

labial and lingual surfaces of the upper centrals were destroyed that the Rowney matrix was designed. There was the prospect of three hours' work before me in these stoppings alone, to say nothing of many other cavities, which set me longing for some shorter road to the attainment of my end; and never did I reach that end so easily before. The result surprised me, both in the result and the time occupied on the work. Every man's bantling is thought by him to be a beauty, but handsome is that handsome does, and those of my fellow-labourers who will follow out my plan righteously will, I feel sure, endorse all that has been said about the Rowney matrix.

I cannot, in the small space allotted to me for this paper, go into all the particulars of the construction of the matrix, I have, therefore, placed the matrix in the hands of the Dental Co., from whom the materials and apparatus, with the most minute directions, can be obtained. The chief difficulty I found in making this matrix arose from the contraction of the metal, but this vanished under repeated experiments. The results are so satisfactory that failure in making any number of matrices is next to impossible.

My plan of procedure is as follows:—Before touching the cavities, I take an impression of the teeth according to the directions enclosed with the materials, and hand it over to an assistant, who makes the matrix while I am preparing the cavities. After adjusting the rubber dam, I try the matrix. If it is too deep—which it will not be if the directions have been closely followed—the edges can be easily cut away with a sharp knife. If it does not keep in position, I bend the labial and lingual edges a trifle, so that they may grasp the teeth tightly; and, further, the patient can close the teeth upon the matrix. This I find to be a comfortable position for the lower teeth during the whole operation.

I fill the retaining pits and build up the gold flush with the cervical edges of the cavity before placing the matrix *in situ*. I next connect the cervical mass with the one formed in the other pit or pits; this done I put on the matrix and build out the gold, laying the pieces horizontally until it covers the matrix first at the cutting edge, working upwards until I meet the cervical portion, always taking care to weld each piece to the gold within the cavity. Much depends on the care bestowed at this stage, and it is well to remove the matrix occasionally to make sure that the

filling is worked close to the lingual edge of the cavity before proceeding further, as there should be no patching needed when the rest of the stopping is completed. I use Wolrab's cylinders unannealed for the first layer over the matrix and complete with annealed cylinders or any other form of adhesive gold which may be convenient.

Most of the work in its early stage is done with Dr. Finley Thompson's hand stoppers, with the occasional use of the electromagnetic mallet. The latter I always employ in the finishing.

When the stopping is completed, the matrix may be removed with the certainty that there will be found a filling which will satisfy the most fastidious operator.

The principle of the Rowney matrix is also applicable to interstitial fillings in the bicuspid and molars, by a slight modification, which is described in detail in the instructions enclosed with the materials.

The drawing shows the matrix in position and also the opening through which the filling is to be done.

OPERATIVE DENTAL SURGERY.

By WILLIAM ST. GEORGE ELLIOTT, M.D., D.D.S.

(Extracts from Lectures on Operative Dentistry delivered at the National Dental College.)

DENTAL PATHOLOGY.

THE first subject we will take up this evening is that of Alveolar Abscess; and as our time will only allow us to look at its practical bearings, its etiology will not be referred to, except to say that this form of inflammation of the periosteum at the extremity of the root is nearly, but not always, associated with a dead pulp and is sometimes caused by the use of arsenic in destroying it. But while this seems to be generally accepted, no data of sufficient importance has been brought forward to substantiate it. At the same time, I have no doubt that if it were practicable to extract the pulp by surgical means, the parts, if treated antiseptically, would certainly be more inclined to unite benignly than if subjected to any irritant; but as it is inhuman to extract a pulp without the use of some local or general anæsthetic, and as in many cases a general anæsthetic is not desirable or convenient at the time, use must be made of

some local obtunding agent. Latterly cocaine has been used a good deal for this purpose, but I must confess that personally I have been disappointed in it. I have sometimes, however, found that the pure alkaloid, if gradually worked into the substance of the pulp with a very fine sharp-pointed probe, will very materially reduce the pain on extraction. On the whole, a general anæsthetic will not only give entire immunity from suffering, but will enable the operator to perform the operation with greater certainty and thoroughness, and this is better than the hypodermic use of cocaine where the pain of introduction, the delay necessary, the uncertainty, and the possible unpleasant after-results, make it less desirable. Still, there are times when the hypodermic is most useful. Consequently, notwithstanding the possible objections to arsenic, it has been, and perhaps will for some time continue to be, the means generally resorted to to get rid of a troublesome pulp.

Whatever the cause, alveolar abscess is a suppurative inflammation of the periosteum, frequently resulting in the formation of a sac filled with pus at the apex of the root. In the early stages, the symptoms are simply those of periodontitis deep seated, but not great pain or tenderness on pressure, with frequently elongation, owing to the conical shape of the fang, the pressure resulting from the inflammation forcing the tooth out of its socket. If a patient were to come to you with the symptoms I have indicated, what would be your treatment? Manifestly, it would be your duty to do what you could to relieve the inflammation; but to do this intelligently, you must be sure of your diagnosis. First ascertain which is the suspected tooth. This is not usually difficult, as the tenderness will be a prominent symptom; then drill into the pulp cavity. Do this in that part of the crown which will render the subsequent treatment easy, by having direct access to the canal. If, when drilling, tenderness should manifest itself—for alveolar abscess is not always associated with a dead pulp—it may be desirable to suspend operations and have recourse to medicaments applied to the gum, near the end of the fang. I have not found any external treatment as valuable as the application of the dental tincture of iodine. This is made by adding an excess of the crystals of iodine to the B.P. tincture. After several months the alcohol takes up a much larger proportion of the iodine. Associated with this,

or in lieu of it, a stimulant may be applied; and lately we have had furnished to us from the dépôts a small felt plaster containing capsicum. This is applied one or more times for several hours each, and will generally be found to give a good deal of relief. But generally sensitiveness is not met with, and the drill enters the pulp cavity. Frequently at this point pus or blood will make its escape, and the patient will express a feeling of relief; but this is not always the case. The pulp cavity is at times found quite empty; it is then your duty to try and reach the seat of the trouble by means of a long fine probe through the tooth. Sometimes the sac can readily be punctured in this way; but generally you must be satisfied with reaching the apical foramen. If no discharge takes place on removing the probe, it will then be desirable to drill out the canal through the apical foramen into the sac beyond.

There are many kinds of canal drills to be had, but perhaps all are open to the objection that they have to be sent to an instrument maker's to be sharpened. I have consequently had the drills made that I now show you; they have two peculiarities, the head or point is triangular and fluted, so that they can readily be sharpened on an oil stone by any one, without special skill, and they are also made in sets of nine, small, medium and large in diameter, and short, medium and long in length. You must have the three sizes; if you have only the long, you are necessarily put to much inconvenience in the early part of the operation, when it will be necessary to open the mouth wide to introduce the drill. The use of the long drill is only called for when you wish to go down through the apical foramen, as I do not think it wise, and often not practicable, to drill out the entire canal for any other purpose.

Where the pulp is dead, whether you wish to treat a case of alveolar abscess or not, take the first opportunity to cone out the canals, open fully into the bulbous portion, and from that open into the canals, first using as large a bur as the cavity will allow, and then follow this with a smaller size; then use the large nerve canal drills and ream out, say, half the length of the canal. You can readily see the object of this cone-shaped orifice; it is to facilitate the introduction of the medicine and the subsequent stopping of the root. When the orifice is fairly accessible, the best way to remove the *débris* from the canal is with a Swiss five-

sided broach, the two smallest sizes made; this should have the point broken off, for a square point will, and a sharp point will not, allow you to push up the bit of cotton wool or, what I consider far preferable, Japanese paper; the temper of the broach should be drawn by passing it quickly through the flame of a lamp, a blue colour being what is most desired—in other words, a spring temper. The soft and extra soft nerve broaches of the dépôts I can find no use for. Wrap a minute bit of Japanese paper near the end of the broach and pass it into the canal, unwind and push it well in, then twist it on the broach again, withdraw and repeat. Sometimes it will take a dozen bits before all trace of discoloration disappears. This is equally necessary either for alveolar abscess or where it is desirable to prepare the canals for stopping. In both cases the syringe (fig. 1) made by attaching a small platinum point, No. 72 S.W.G. with a hole of No. 81 S.W.G. to the pistonless hypodermic syringe is most useful. For alveolar abscess, first fill the syringe with warm water, and after placing the point far up in the canal, wash



Fig. 1.

it out by alternate compressing and releasing the rubber bulb; then draw all the water out and repeat with peroxide of hydrogen. If bubbles appear, of course pus is present. Then introduce a solution of pure carbolic acid by means of the same syringe, filling the cavity nearly full; take a piece of softened red gutta percha, in bulk a little larger than the cavity, and by the use of a large flat-pointed instrument, nearly as large in diameter as the orifice, with considerable pressure force the carbolic acid, and if a fistula is present the carbolic acid will probably appear at its orifice. The presence of a fistula adds very materially to the probabilities of success, as it allows a free passage for the medicine through the seat of disease.

Should there be no fistula, the treatment is very much the same, except that, as it is difficult to force the carbolic acid into all parts of a closed cavity by the process mentioned, on account of the presence of air, resource must then be had to the use of fine probes, working the carbolic acid into the most remote parts. The cavity is then filled with Japanese paper and the orifice stopped with paper soaked in sandarach. This ends the

first dressing. The patient is directed, in case of pain, to remove the plug from the orifice. The second dressing is the same as the first; if a fistula is present, and you have been successful in forcing the medicine through it, it will in many cases be found to be closed, but two or more applications are generally necessary. Should it be impossible to force the carbolic acid through, resource must be had to either drilling through the nerve canal into the sac beyond, or to the production of an artificial fistula by piercing the alveolus through the gum. This can be done with little pain by touching the gum with a crystal of carbolic acid before drilling, or preferably by the hypodermic use of cocaine, in which case efforts should be made to keep the fistula open by means of a piece of cotton wool until the treatment of the case is completed. It is seldom necessary to treat the tooth in this way many times; if the abscess does not readily yield to treatment, it will sometimes be found that persistent effort may cure it; but in these obstinate cases the tooth is often eventually lost. It will generally be found, however, by following the foregoing treatment, that eight out of ten cases will be successful.

When the abscess is cured it is, of course, desirable that the pulp canals should be filled. If they are not, they will always be a possible cause of trouble. I have found nothing as convenient and effective for this purpose as a solution of gutta percha. The ordinary base-plate does as well as any other preparation, and should be dissolved in chloroform till it is of about the consistency of cream. The canals should be prepared by syringing them with an antiseptic, as carbolic acid or a solution of iodoform dissolved in ether, with one per cent. of bi-chloride of mercury added to it; then blow a stream of hot air into the cavity. This is best done by taking an ordinary half-ounce bulbous syringe, placing the point in the flame, and drawing it into the tube several times. Now place a minute pallet of Japanese paper soaked in some antiseptic at the apical foramen, to prevent the passage through of the liquid G.P., then fill the cavity with the solution of gutta percha, and pump it into the nerve canals with a broach. Care must be taken that the patient's head is in such a position that gravity will assist the flowing of the solution. Reliance must not be placed alone on this solution to fill the pulp canals, but pieces of softened gutta percha must be forced into them with suitable instruments.

When the canal is sufficiently large and accessible, a tapering piece of gutta percha, not softened, is pushed into the canal. The whole cavity is now filled with gutta percha and left for a year. If no further trouble supervenes, the tooth can then be more permanently stopped.

Pyorrhœa alveolaris is a disease very commonly met with in this country. It can readily be detected by the use of a probe, as the gum and soft parts are partially detached from the tooth; it may or may not be associated with absorption of the alveolus. It is generally caused by neglect, the proof being that it is far more frequently found on the lingual sides of the teeth than on the outsides, as these parts are seldom reached by the tooth-brush; even those who try to take care of their teeth fail to realize the importance of cleaning them as much on the inside as on the outside. While the cause is usually the accumulation of irritating matter round the necks of the teeth, yet there is a good deal of evidence to show that this disease is often caused by systemic disturbances. In the treatment of pyorrhœa alveolaris it is at first necessary to thoroughly remove all tartar, then, by the use of the syringe previously described, peroxide of hydrogen is forced up under the gums as far as possible; this is followed by the injection of a solution of equal quantities of aromatic sulphuric acid and iodine; the application of these medicines should be repeated at intervals of a few days for several weeks. Generally speaking, the prognosis is unfavourable. If the disease has progressed extensively, it is useless to attempt medication; at best, the improvement resulting from treatment would not be of long duration. Where the disease has not progressed extensively, the teeth can be made comfortable, and the results may be fairly permanent, but not unless the patient is sufficiently appreciative of the efforts being made, to carefully follow the directions given, viz., to keep the teeth exceedingly clean, and to stimulate the gums by the excessive use of the tooth brush.

This disease would not be so common if people were in the habit of using hard food, which would keep the teeth cleaner and be more effective in that way than the tooth brush. A great many medicines have been used in the treatment of pyorrhœa alveolaris, as chloride of zinc, tartrate of chinoline, iodide of zinc, &c., but I have found none of them so useful as those already recommended.

Before leaving this branch of our subject, I must say a few words in regard to sensitive dentine. It is one of the greatest obstacles we have to contend with in the thorough treatment of caries by stopping. Where one has a proper appreciation of the feelings of the patient, one naturally desires to inflict as little pain as possible. I have found in my own practice that where stoppings have failed it has generally been owing to a lack of thoroughness in the excavation of the cavity, caused by too much sympathy for the patient. But I would rather have these failures, amounting to about two per cent. of stoppings put in, than have a reputation for inhuman thoroughness. A great many pain obtunders have been brought forward from time to time, but none have realized the expectations of those who have introduced them. When cocaine was introduced, we expected great things from it; in some cases it is no doubt useful, particularly if the tooth is soft. It is possible that the lack of success met with in the use of this alkaloid may be owing to the want of stability of the preparation furnished to us. I generally use it pure, and have met with most success in cases where the gum is to some extent involved. For some weeks I have been using the Herbst obtunder, with variable results; it generally produces some pain on application, and its good effects when produced are very superficial. The use of hot air, conjoined with that of the rubber dam, is generally found to be a reliable obtunder. Sometimes I have found beneficial results following the use of vaporised ether with cocaine; this is applied by drawing into the partially-heated syringe a drop or two of twenty per cent. solution of cocaine and ether. Carbolic acid may be applied in the same way, where it is indicated, to relieve the pain of an exposed pulp.

But by far the best agent for the relief of sensitive dentine is chloroform. If the patient is given a $\frac{1}{2}$ -oz. bottle of chloroform, and told to breathe some in through the nose, in about one minute you can continue the excavation, and find that the pain is very much relieved, while the patient is perfectly conscious; an occasional inspiration of the chloroform will keep up the effect. I have used this remedy for fifteen years with almost invariably good results. Of course, the patient need never be allowed to lose consciousness.

Hyperæsthesia of the enamel is occasionally met with, and I

have been able to find no permanent relief for it except devitalization of the pulp. Temporary relief may be given by the local application of arsenic.

INAUGURAL ADDRESS.

By ALEXANDER CORMACK, L.D.S.Eng.

(Delivered to the Members of the Edinburgh Dental Students' Society on November 7th, 1886.)

MR. PRESIDENT AND GENTLEMEN,—When last I had the honour of appearing before the Edinburgh Dental Students' Society, it was on the occasion of a social gathering, met to celebrate the conclusion of a most successful session, and, Sir, judging from the prospectus of work which will occupy this session, and the known ability of those who are to contribute papers in furtherance of the objects of the Society, I am quite justified in anticipating one even more prosperous.

Gentlemen, many of you now present are about to commence a course of study which shall fit you to practise the profession you have chosen. With a view to making the most of the short time I am to occupy your attention to-night, somewhat more useful (though perhaps less ornamental) than is sometimes the case on such occasions, I have elected to present for your earnest consideration some practical suggestions on the scientific method of study.

This is a most important subject, and merits much more attention than is generally bestowed on it. Indeed, I doubt if nine students out of every ten who begin work ever have a concrete idea of any general plan of storing the mind with facts in such a manner, that from the vast multitude of facts relating to the many varying subjects of your study any necessary items of information may at any time be readily recovered.

I here suggest a metaphor: The memory a storehouse, so methodically packed that the mind instinctively knows where to look for every fact contained in it.

The art or science of study contains two equally important branches.

I. The general method of acquiring facts, *i.e.*, fixing them in the memory and in a logical and inductive way building on them the consequent theories.

II. The cultivation of the memory, by the use of every collateral aid that presents itself, and by the exclusion of all relaxation—as it is called—which would have a tendency to disorganise the methodical exercise of its functions.

I am not about to advocate an impossible state of ascetic study ; my own youthful days have not yet so completely disappeared in the remote past that I could not conceive that such an advocacy on my part would run some risk of failure.

GENERAL METHOD OF STUDY—THAT IS, OF ACQUIRING FACTS.

The theory I wish to propound to you is this, to begin with the fundamental principles or radicles, and to work up from these through the ramifying branches growing from them to the minutest details of the science.

It is the converse of this method that is generally followed, the student seizing on the most prominent facts or details, and ultimately inferring from them a knowledge of the broad principles which should have been the starting point of his enquiries.

To no science does this more particularly apply than chemistry. Without a thorough knowledge of its fundamental principles, its study will seem a mere effort of memory in getting up certain formulæ, certain metals, gases and acids, which, once learnt sufficiently to please the examiners, will disappear from the mind like breath *from a razor*.

How different the result when once the principles of chemistry have been mastered ! Details may be forgotten, but a brief reference to a text book will bring them back as fresh as ever.

My meaning may be more readily understood by referring to the methods by which a painter arrives at his finished results. He first sketches in his conception broadly, then gets in the salient facts ; afterwards the connecting links—technically called “bringing the picture together”—and last of all the details. Each stage works naturally into the other, *but* if the artist had commenced with details, confusion would have been the result. So with scientific study !

Regarding the second division of our subject, a point I would draw your attention to is the literature which should be used, at once as a relaxation and an aid to study. Now, biography and history, especially the latter, will be found eminently useful for these purposes. Such studies never clash with science, whereas

the reading of fiction is apt to disturb the mental balance by causing a distaste to scientific literature on account of the dryness of the latter and the necessity of bringing to its perusal greater mental efforts. Fiction excites the imagination alone, and its due appreciation demands an utter absence of all reasoning powers. It is well known to medical men that the immoderate reading of the lighter class of literature brings about such a condition of mind that people indulging in it gradually abstract themselves in imagination from this every-day world and walk about in a world of their own, peopled by men and women the creation of their own fancy.

Let us look at the manner in which the historian sets to work. He takes up certain salient facts, drawn from reliable documents, and taking into consideration the political feeling and the personal character of the statesmen involved, and other causes working at the time, leads by a course of cogent reasoning to the circumstances which brought about the known result. Macaulay more than any other historian will follow out this induction in five or six sentences, and I would warmly recommend his essays and history to your perusal.

Still another point I would direct your attention to, is the value of sketching from memory any part you may have been studying in such subjects as anatomy, surgery, physiology or medicine, or our own three particular branches. This habit once acquired, and with it that of correcting from text books, will be found invaluable. It will, on being questioned on any particular part bring the details at once before one, like the mention of some well-known view.

To give an example. In reading or in conversation, reference to a country, say in Europe, will immediately and instinctively bring before your mind's eye a map of Europe in which you will not only see that particular country, but a bird's-eye view of its general features and the countries bordering on it, and all this although you may never have seen a map of Europe for years.

There is another aid to study which I have not yet mentioned, but which is most important, and that is the free discussion of various subjects relating to our profession. Discussions such as you propose to hold during the coming session will have the dual effect of developing memory and speech; they will enable you by practice to take a broad and comprehensive view of a given subject and to deliver an opinion clearly and succinctly. I need go no

further into this special subject, as on the last occasion I met you I endeavoured to point out to you the value of such early training, both to yourselves and to the societies which in after-days you will find it your advantage to join.

Gentlemen, I shall not go at greater length into this subject. Time has allowed me only to touch on the various points, but if you have been able to follow me in my argument, a very little thought on your own part will, I am confident, strengthen such reasoning as I have endeavoured to employ.

In conclusion, let me hope that whether by the road I have indicated or by one that shall seem to you better, you will each arrive at the wished for results, viz., a thoroughly prosperous session, which will lay the foundation of a successful and valuable career in your profession.

IMPLANTATION OF TEETH.

By WM. J. YOUNGER, M.D., of San Francisco.

(A Paper read before the New York Odontological Society, October, 1886, and reported in the "Dental Cosmos.")

GENTLEMEN,—By implantation I mean that operation which involves the forming of a socket in the jaw, either where one has been obliterated by time or where the part is virgin—never having borne a tooth—and into which socket a tooth is planted. I have chosen this term, not only on account of its fitting etymology, but to distinguish it from the old and well-known operations of replantation, which is the returning of a tooth to the place in which it grew, and transplantation, which is the transferring of a tooth into a socket from which another tooth has been freshly drawn. This operation of implantation, which has aroused so much antagonism, and the success of which is viewed with so much scepticism, both by the practitioners of our own profession and those of medicine, has been in my hands thus far as successful as any other operation requiring skill and judgment known to our art. The objections that have been urged against implantation are not only all those that have been made against transplantation—the chief of which is the liability of the transmission of disease—but the additional danger due to the traumatic lesion which is involved in the operation, and a supposed tendency in consequence to inflammation, pyemia or septicemia, tetanus, &c.

Another reason for doubting the success of implantation is the popular belief that the natural socket of the alveolus has a periosteal lining, and that it was to this periosteum that attachment to the peridental membrane, and consequently the tooth, was due. This, or something like this, has been the teacher of our schools and text-books. I think, however, that in the pamphlet issued by me last March I clearly demonstrated, by reasonable deductions, that no such membrane as a periosteum lining the socket exists or has any part in the formation of the cavity, and that the pericementum has no creative energy except upon its dental aspect, its alveolar surface having simply the power of forming attachment and drawing nourishment. That it has this power is evidenced by the fact that it will attach itself to the vascular structure of a cock's comb, so well proved in that particular experiment narrated by John Hunter, where the fowl was killed after a few months, and microscopical examination showed that the blood-vessels of the cock's comb had united with those of the peridental membrane, and so had established direct and continuous vascular communication between the two heterogeneous tissues. This same experiment also proved that the pericementum has no bone-producing power on its external surface; otherwise a bony shield would also have been found surrounding the root.

In the pamphlet referred to I called attention to the well-known fact that the crown was the first portion of the tooth formed by the dental pulp; that as it was developed it pressed upon the inclosing alveolus; that this pressure caused the absorption of the osseous environment, which absorption continued until the crown burst through its bony prison, and rose, as the body and root developed, to the apical termination and attained its proper elevation in the mouth. As the cavity of the socket was formed by pressure, it is clear to see that no periosteum was employed in its formation. The crown being larger than the body of the tooth when it passed out of the jaw, left a space between the root and the walls of the socket, which, in the course of time, filled up with a bony substance identical in composition with the surrounding structure. Here we have an example and a clear proof of the ability of the alveolus to repair an injury done to itself. When the crown is forcing its way through there is no attachment to it, because it is like so much flint or porcelain; but as the root with its pericemental investment is developed, immediate attachment takes place, and the pericementum

is nourished and stimulated in its growth by the vessels of the alveolus. How does the space between the wall of the socket and the body of the tooth fill up? We have shown by the experiment in the cock's comb that the pericementum does not produce bone on its external surface, and as there is no periosteal membrane lining the socket, the space must be filled from the walls of the socket. Osseous deposition takes place, then, as in other bones, when the lesion is remote from the periosteum, by proliferation of bone-germs from the endosteum; which, as you all know, is the delicate continuation of the periosteum in the interstices and cells of the bony structure, and having all the functions and powers of the mother membrane.

Now, I hold that the same conditions attend the operation of implantations as occur in the development and eruption of a tooth, with this difference, that in one case the destruction of the jawbone is subjected from within out, and in the other objective from without in. The one is physiological, the other traumatic, but it is in either case a lesion of structure produced by force, with the conditions in favour of the traumatic. For in the natural operation, as you are all aware, there is more or less constitutional disturbance, even sometimes to a fatal degree; whereas in the mechanical process the disturbance is only local, and slight at that. When the implanted tooth is in position the relations are almost identical with those surrounding the freshly erupted tooth from its bony environment. It is tooth-substance,—pericementum, plasma, and raw bony surface. In this view of the matter, it is easy to understand that the tooth implanted is not more foreign to the alveolar process than is the tooth developed within its own substance. It is, therefore, no wonder that the intruder is accepted on the same terms as the developed tooth, especially in view of the fact that the alveolar process has no special intelligence, and is intended for no other purpose than the support and maintenance of teeth. Further proof that the jawbone accepts the new tooth on the same terms with its own, is that in the three instances where I have had to correct the position of these implanted teeth, after they had become firm, they have behaved exactly as do the teeth of native growth.

Now, as to the danger attending the operation. There is, of course, no operation, however trifling, that some hidden idiosyncrasy in the patient may not lead to dangerous results. The lancing of a gum.

has induced tetanus. The extraction of a tooth, even the too close snipping of a hair in the nose, has induced fatal hæmorrhage, and so, in that view of the case, there is danger to some in performing the operation of implantation. But who would hesitate to lance a gum, or extract a tooth, or to snip a troublesome hair in his nose because fatal consequences have attended these operations? So will it be with implantation! The great danger to be guarded against is the inoculation of disease. But it is no more so in implantation than in transplantation. Of the hundreds of cases of transplantation that have been performed in the United States, I have yet to hear of one where specific disease was communicated by it. One case—but that was replantation—is on record where it is said tetanus ensued. But was it tetanus or peritonitis? The danger of such transmission of disease has been very greatly exaggerated. Nevertheless we cannot be too cautious in our selection of teeth. Those only should be used where the tooth-substance has a clean, clear appearance. They should then be subjected to a bath of bichloride of mercury, 1 part to 1,000 of water, as an additional security. So powerful a germicide is this corrosive sublimate, even at this decimation, that it will destroy the life of, or at least render inert, the most baneful of germs; and this without affecting the vitality of the pericementum. The wonderful tenacity of life in this membrane is something that was not dreamed of until the accidental discovery related in my report to the California Dental Association, and a copy of which many of you have seen. Another danger would be the drilling into the dental canals; but this can be easily avoided by not drilling beyond the length of the other teeth. The canal, you must remember, is always beyond the apices of the teeth, and only a bungler would broach it.

There are two things that are always essential to success in implantation, and that must be considered before the operation is undertaken. They are, first, that the root has a fair covering of pericementum; secondly, that sufficient of the alveolar process be left to root the tooth properly, in order that it may be able to withstand the lateral and grinding movements of the jaw. At least two-thirds of the root should be covered by the gum and alveolar process. Where there has been but slight shrinkage of the alveolus it is not necessary to imbed as much root as the other teeth have. You have no doubt observed that, in teeth that

have been elongated by disease, the disease cured and the projecting portion cut off, the tooth has become as firm and performed its function in mastication as thoroughly as it did before disease had attacked and shortened its length in the socket.

In the operations that I have had the honour of performing before you, especially in the implantation of the two inferior centrals, a great portion of the external wall of the alveolus had to be removed. You will find that within one month sufficient osseous deposition will have taken place in front and on the sides of those teeth to hold them firmly in position. I have written this little paper in a great hurry, and therefore have been unable to give this subject the consideration it deserves, and which you had the right to expect. Therefore, in whatever I have been deficient or obscure, I will, if it shall so please you, answer any relevant question that may be asked, if it is in my poor capacity to do so.

THE ODONTOLOGICAL SOCIETY.

THE Annual General Meeting was held on January 10th, Mr. T. CHARTERS WHITE, President, in the chair.

The Librarian and the Treasurer submitted their reports for the year, and the Curator, in the course of his report, said that in one specimen a feature had transpired which no one had any idea of when the specimen was originally described. Last year a very small nodule was shown on a lower jaw, and it was supposed that a supernumerary tooth was embedded in the lower jaw; the bone was cut away and the tooth taken out of its socket, and then, to his surprise, a thin streak was seen on the inner wall, like the cementum of another tooth. On taking the tooth out to examine it carefully, two very curious supernumerary teeth presented themselves. The specimen was quite unique.

The following office-bearers were elected for the ensuing year: *President*—Charles S. Tomes, F.R.S.; *Vice-Presidents*—(resident) Henry Sewill, S. J. Hutchinson, J. H. Mummery—(non-resident) Andrew Wilson (Edinburgh), Richard Rogers (Cheltenham), G. C. McAdam (Hereford); *Treasurer*—James Parkinson; *Librarian*—Felix Weiss; *Curator*—Storer Bennett; *Editor of the Transactions*—Frederick Canton; *Honorary Secretaries*—R. H. Woodhouse (Council), Willoughby Weiss (Society), C. J. Boyd

Wallis (for foreign correspondence); *Councillors*—(resident) Morton A. Smale, Arthur S. Underwood, E. G. Betts, J. F. Corbett, Thomas Arnold Rogers, Sir Edwin Saunders, John Fairbank, David Hepburn, Ashley W. Barrett—(non-resident) J. R. Brownlie (Glasgow), J. H. Whatford (Eastbourne), F. H. Balkwill (Plymouth), George Brunton (Leeds), E. Apperley (Stroud), J. H. Redman (Brighton).

Dr. WALKER made a "casual communication" with regard to Mr. Cunningham's method of coating vulcanite dentures. He said that since the discussion of the subject he had prepared four dentures in which the mucous membrane was very much congested and the epithelium of the very slightest character; no heat was caused in their wear, and he could detect no kind of congestion round the necks of the teeth. The object of coating vulcanite with gold was to prevent congestion and heat. He had examined the dentures after a month's wear, and he found no disposition of the gold to peel. Dr. Walker showed nine specimens, which he said had been prepared under the supervision of Mr. Cunningham, to whom he felt indebted for an immense stride in vulcanite work. He also showed the Bunsen battery used in the process, and expressed the pleasure it would afford him to show any members who felt interest in the subject how the specimens were produced. He felt convinced that Mr. Cunningham's process was a big advance in vulcanite; but, unfortunately, Mr. Cunningham, who was not a member of the Society, was too advanced in life to make it at all probable that he would obtain an adequate recompense for his ingenuity and labour, and for the benefit likely to accrue to the public and to the profession by the adoption of his process.

The PRESIDENT, in inviting discussion, said that they would all remember the great outcry there was a few years ago about the poisonous effects of vulcanite, but the coating of gold on the vulcanite would disarm all opposition.

Dr. WALKER said, with reference to the poisonous effects, he had a case under his care for eighteen months. The patient had been wearing upper and lower dentures of black rubber, and had contracted ulcers of different sizes in different cavities; one, underneath the tongue, was three-quarters of an inch long. After every possible means had been tried to get rid of the ulcers, the surgeon said the rubber must be given up in favour of gold. Dr. Walker then made rubber dentures with thick deposits of

pure gold, and the ulcers disappeared. There was enough gold in these dentures to increase their strength. This case had occurred within the last eighteen months.

Mr. STOCKEN did not think that the effect of dentures producing ulceration upon the gums was confined to vulcanite alone. He had had two cases since he had been in practice; one, a dental alloy case, fitted most accurately, but there was a certain amount of irritation, and minute ulcers appeared in the mouth. He then made a vulcanite case, and the lady had been perfectly healthy since. He thought it well that both sides of the question should be represented.

Dr. REDMAN mentioned a case of ulceration which he had had, caused by rubber, and completely cured by the substitution of a gold case.

Dr. WALKER, replying to questions, said there was no objection to coating vulcanite both on the palate and gum surfaces, except the weight. He was very pleased to hear the remarks as to the generation of heat by rubber; in none of the cases he had prepared was there any heat from wearing the faced vulcanite. If with a deposit of pure gold the heat could be got rid of, that alone would recommend it.

Dr. ELLIOTT, referring to another matter, said that the members were aware that one of the objects of the Society was the cultivation of social intercourse. While many years had been given to the cultivation of the intellect, the cultivation of social intercourse had been to some extent lost sight of. With a view to set the ball rolling, he invited the members to come to his office at two o'clock on Monday, February 7th, when he hoped to have two operating chairs going; but, before that, Dr. Rosenthal, of Liège, Belgium, would give a demonstration the following afternoon at five o'clock at his (Dr. Elliott's) office, and he would be pleased to see any of the members there on either or both of the occasions.

The PRESIDENT, on behalf of the Society, thanked Dr. Elliott for his invitation.

Mr. S. J. HUTCHINSON gave an account of a rapid method of treating a case of irregularity which he had adopted with a patient, a young lady aged about twenty-five. She had a lateral incisor very much displaced in the palate, and it did not appear possible to push this tooth into place by any ordinary means of regulation; as a young girl, she had worn five regulation plates. After careful

examination, he saw that the root was misplaced as well as the crown, and he decided it was a case in which some other than the ordinary treatment might be adopted. He made a gold collar which very tightly fitted the lateral tooth, and on to the gold collar he fixed an artificial lateral tooth in the position which the natural tooth ought to be; he then painted the natural tooth and the gold collar with osteo cement, and fitted the tooth in with the most satisfactory results. He wished to enter a disclaimer as to any accusation of damaging the natural teeth, for he did not believe that this gold collar, carefully fitted and lined with cement, would cause any greater decay than would have existed from the previously crowded state of the teeth. So that it was possible to regard the matter from an æsthetic point of view, and as he was called upon to treat the case, he believed he had gained the best results with the least risk of any unfavourable termination.

Mr. MORTON SMALE, in referring to the subject of cocaine, said he felt a certain hesitation in introducing the subject again to their notice, and he should not have ventured to do so after the careful and thorough investigations of Messrs. Hunt, Boyd Wallis, and Brunton—to the former of whom he thought they owed a debt of gratitude,—but for the fact that the profession, as a whole, was in a condition of suspended judgment on the matter, and it appeared to him time that this suspense was removed. With a view to the attainment of this end, he thought some authoritative decision should go forth from the Society; it seemed to him well within the duties and scope of the Society that they should give such an opinion for the guidance of the profession. He suggested that a committee of careful investigators should be formed for this purpose, and believed an opinion, based on their report, would carry with it the weight of authority, and attain the object in view by dispelling the uncertainties which existed as to the limits of the action of cocaine, and finally decide its proper place and value as an obtunding agent. After referring to his early opinions, which he said had been considerably changed since the introduction of hypodermic injection, Mr. Smale gave an interesting account of some experiments which he had made upon himself. For some time he had been using various strengths, but latterly he had discarded the weaker and now only used the three stronger solutions.

For a variety of reasons, there was always more or less

difficulty in ascertaining the precise effect of a drug upon a patient; he, therefore, determined to test cocaine upon himself, and in order to give its action full and fair play, he considered what would be the most painful operation, and decided to drive a wedge of hickory as far up the gums as possible with the mallet.

He injected 5 mms. solution cocaine into his arm, and 5 mms. 25 per cent. solution into the gum, over the incisors. After the lapse of about eight minutes, he took a wedge of hickory and pushed it up against his gum with all the force he could possibly use, at the same time pushing it up against the teeth, and wedging it against the parts. In order that no force should be wanting, he endeavoured to drive the peg further by pushing his head against the wall; he left the peg in without any discomfort, and then drew it down the whole length with his fingers without feeling any pain.

The PRESIDENT remarked that he was sure they must all feel thankful to Mr. Morton Smale for his courageous experiment upon himself.

Dr. WALKER supported Mr. Smale's proposal for a committee, and said he would be glad to second a resolution for its appointment.

The PRESIDENT said it would be *ultra vires* for them to appoint a committee at that meeting.

Mr. F. J. VAN DER PANT showed a geminated bicuspid, removed from a lady aged twenty-two under chloroform, which he considered curious, if not unique; the medical man could not ascertain anything abnormal in the history of herself or family.

The PRESIDENT then delivered his

VALEDICTORY ADDRESS.

The close of another year of the Society's existence had brought with it the surrender of the honour conferred upon him at its opening. It was needless for him to say how gratified he had felt at having been allowed to serve the Society in the capacity of President; it would be a pleasant remembrance to the end of his days.

The year had not been marked by any startling novelties in Dental Surgery, yet there were encouraging signs that the study and treatment of dental diseases was being pursued with a careful attention, which must ultimately lead to the further alleviation of the peculiar sufferings for which the aid of the profession was sought.

Dr. Dudley Buxton had contributed a valuable paper on "The Physiological Action of Nitrous Oxide." The advantages of careful observation and practice in the administration of this beneficial agent were great, but the administrator would be the more assured by bearing in mind the physiological effects he is inducing in his patient. Dr. Buxton's paper, therefore, was one which every dental practitioner would do well to master.

Mr. Bland Sutton, to whom the Society had often been indebted for valuable papers, had furnished one of great interest on "Dental and Oral Cases in Animals." Mr. Sutton's papers, though not coming within the scope of daily practice, were nevertheless valuable as collateral adjuncts to general professional knowledge. In this age of great mental activity, the educated classes were very omnivorous in their reading, and practitioners ought to be prepared to give an answer to the questions which were often put to them by intelligent patients. He hoped, therefore, that Mr. Sutton would on many future occasions favour the Society with further contributions on the subject of Comparative Dental Pathology.

Histology, again, although not a branch of study absolutely required by the dental practitioner, was one which he could scarcely do without a knowledge of. There would be in the course of his practice many occasions on which he would desire to investigate abnormalities in teeth or other parts of the oral cavity, and to be able to recognise their histological characters was a great assistance in diagnosis. But to demonstrate the histological elements of even a simple membrane was not easy without a knowledge of the effects of various reagents and staining fluids. Staining fluids, in particular, had added new powers to microscopical research, bringing out hidden elements of a tissue which would otherwise have been overlooked, and it was to direct attention to this valuable aid to histological pursuits that Mr. Grove's paper was specially directed, with a clearness resulting from close familiarity with the subject.

Mr. Storer Bennett, in a short paper, had called attention to the recent additions to the museum, and lastly, at the December meeting, he had himself contributed one commenting on a number of fragments of human maxillæ, possessing great interest as relics of the "stone age," which, by the courtesy of his friend Mr. W. Cunningham, he was enabled to present to the notice of the Society.

Although the papers contributed during the past year had not been quite so numerous as was usually the case, there had been no lack of interesting and instructive Casual Communications to make good the deficiency. Really good papers, fit to be presented to such a Society as theirs, could not be always made to order,—they should be the outcome of years of study and observation. Casual Communications, on the other hand, were always welcome. A paper on some subject to which the author had been giving individual attention for years, however valuable and instructive it might be, was seldom capable of being discussed, since it must almost necessarily surmount the attainments of the audience in that particular direction. But Casual Communications appealed to the experience of all, and oftentimes contained the germs of some practical application which, being fertilized by discussion, was made available for the benefit of all. At the same time he was far from wishing to speak disparagingly of papers, especially of those which were not merely written to stop a gap, but were the result of intellectual energy devoted to the working out of some of the many subjects cognate to dentistry, which afforded an attractive field. These were always valuable, but could not be common.

One event of the past year could not be omitted from his brief summary,—viz., the meeting of the British Dental Association in London. It was gratifying to know that the Society's conversazione was thoroughly enjoyed by all who attended it, and it had afforded the London members great pleasure to hold out the the hand of welcome to their provincial brethren, and to make the personal acquaintance of many whose names and work they had previously known only by the good reputation which had preceded them.

Our beloved Sovereign, who throughout her long and prosperous reign had always encouraged and recognised worth under whatever guise it had been presented to her notice, had, during the year, added another honour to the dental profession by dignifying one whom all its members looked up to and revered as their leader, one whose literary and scientific achievements have been appreciated by all, from whose first work might be dated the elevation of the dental profession as a special branch of surgery. He need not say that he alluded to Sir John Tomes. Long might he be spared to guide with his counsel and encourage with his approbation !

In conclusion, he would take the opportunity of thanking the officers of the Society for all they had done during his year of office to lighten his labour and smooth his path ; he felt assured that while the Society had such men to serve it, it would never fall from the high and influential position to which it had attained.

Mr. GEORGE GREGSON : Mr. President and Gentlemen, I rise for the purpose of proposing a cordial vote of thanks to our worthy President, who has so ably filled the chair during the past year. I have seen many presidents here, but I am sure you will agree with me that Mr. Charters White is one of those who will specially dwell in our recollection for the efficient manner in which he has discharged the duties of his office and furthered the interests of the Society. He has been most regular in his attendance here, and has faithfully guarded the Society's welfare. We missed him on one occasion owing to ill-health ; however, we are very glad to see him again looking so well. Long may he live, long may he prosper ! I beg to propose the vote of thanks to the President.

Mr. MORTON SMALE said it was impossible in his presence to say all that one would like to say about Mr. White. He wished he were not there that he might speak more freely, but he would just like to say that he thought it had been proved, by the way in which he had guided the Society during his year of office, how much the Society's successful and harmonious working was due to its President.

In seconding the resolution, which Mr. Gregson had so kindly proposed, he would say that it will be with great regret that they will miss Mr. White from the presidential chair.

Mr. STOCKEN proposed votes of thanks to the officers of the Society, and said it was indeed very pleasing to him that he should be called upon to make that proposition. It was fortunate that there were so many gentlemen who were willing to devote so much of their time to the welfare of the Society.

Mr. H. CAMPION (of Manchester) had very much pleasure in seconding the resolution which has just been proposed. After what has been said by the President and the last speaker, it would be useless for him to say anything further of the character of the officers. On behalf of the provincial practitioners, there are (he said) a great many members in the provinces who are unable to attend the meetings as often as they could wish ; but, nevertheless, they continued to take an interest in the meetings.

Mr. FELIX WEISS (the Librarian), in returning thanks for the

officers, said he was sure that the officers of the Society so thoroughly understand the honour that is conferred upon them by being its officers, that they would be sufficiently repaid without the vote of thanks, not that they appreciated it the less.

The PRESIDENT: It now only remains for me, gentlemen, to thank you for the very kind manner in which you have appreciated my services. I can only say that the pleasure has been very great to me; and now, being freed from the ties of office, I shall have more time to give to the meetings.

ODONTO-CHIRURGICAL SOCIETY.

At the meeting held on December 9th, a discussion arose upon the disease known as

PYORRHŒA ALVEOLARIS.

The PRESIDENT said the disease, for some time termed Riggs' disease, and now better named Pyorrhœa Alveolaris, has long been known, but has only been much debated during the last 20 years by Riggs, Mills, Albrecht, Wedl, Salter, Tomes, Arkovy, Miller, Rerwinkel, and others more or less known in the scientific walks of dentistry. I do not propose to enter an opinion as to its pathology or etiology, nor yet to discuss the various methods of treatment or remedies advocated by these gentlemen, but will confine myself to a simple statement regarding the use of sulphur as a curative agent in this lesion. Whatever may be our opinion as to the part which tartar plays in this disease, I think we are all agreed that tartar being matter in the wrong place, it should, if present, be thoroughly removed, so as to give any subsequent treatment the best possible field for its recuperative action. This being done, I find that the bi-daily cleansing of the teeth and gums with a tooth-powder composed of flowers of sulphur and precipitated chalk, will very soon restore the parts to a healthy condition, the pus secretion will cease, and the teeth become firm in their sockets. Whether the tartar be the cause, or only a concomitant, or the pyorrhœa be owing to a perverted condition of the mucal secretions, sulphur will, and does, act beneficially.

Its therapeutic action is stimulating and antiseptic, and it is likewise a solvent of calculus. If it contains a little free sulphurous acid, which it frequently does, so much the better.

As I have said, it is stimulating, antiseptic, and a solvent of calculus, and it has this further, and what, I think, very great merit, viz., that it can be regularly and thoroughly applied by the patient. I have now been using it for over a twelvemonth, and have reason to be satisfied with its uniform success; and as I recommended it to the members of this Society in March last, I will be pleased to hear how it has succeeded with those who have given it a trial.

Dr. SMITH said he had not been present at the last meeting, and his being called upon to make any remarks upon this interesting and somewhat important affection to-night was unexpected. In the first place, he would say that he believed the mixed power of sulphur and magnesia, brought before the Society by Mr. Macleod, was, in all probability, destined to be of much service, not only in pyorrhœa alveolaris, but in other affections of the mouth. The *rationale* of its action seemed founded upon tangible principles, as there was no doubt that sulphur and its combinations had played a prominent part in the rôle of therapeutics as applied to similar affections. With reference to the pathological nature of pyorrhœa alveolaris, or Riggs' disease, two theories might be advanced—first, that it commenced from without; and second, that it commenced from within. Among those cases commencing from without might be classed such as originated in the alleged irritation caused by the deposit of tartar, or in inflammation of the gum and mucous membrane; and among those originating from within, the occurrence of alveolar caries would, in all probability, be found a common cause. Tartar and inflammation of the gum did not always give rise to the symptoms distinctive of pyorrhœa alveolaris, but caries of the alveolar walls invariably did so. The anatomy of the parts in a great measure accounted for this. It was admitted in surgery, that, as a general rule, pus seeks the nearest and easiest mode of outlet, and if this were an affection of the gum and submucous tissue, it would manifest itself to a proportionately greater extent beyond the margin of the alveolar cavity than it very frequently does. But, in a large number of cases, the symptoms during its continuance, and the appearance and lesions of the alveolar walls after its existence, showed that these had been the structures principally concerned in the disease. This accorded with Dr. Smith's own observations in this affection, to

which he had for long paid considerable attention ; and also with the morbid appearances described by most writers on this disease. Dr Smith had said that, *primâ facie*, the disease commenced with, and consisted in, caries of the alveolar plate ; and that the tartar deposit and inflammatory appearance of the gum, were possibly of a secondary nature. It might be argued that the alveolar plate was not altogether the kind of bone in which caries occurred ; that necrosis and rapid separation of the dead part would be more likely to take place there than a long protracted ulcerative process. But this reasoning was here to be met in the local modifications of the bony tissue. Necrosis was, no doubt, the common affection met with in compact bone, and caries in the cancellous variety. This did not arise from the disease in its ultimate pathology being different in the two cases. In necrosis, the result of the inflammatory action and exudation was death of a piece of the bone by obliteration of the vessels contained in the Haversian canals, owing to the unyielding nature of the mass of compact bone surrounding them. In cancellous bone, room was afforded for dilatation of the vessels, so that complete stasis was not occasioned by the exudation. And in the very attenuated alveolar walls, the pressure outside the vessels would be comparatively diminished also, and might explain the more frequent existence of caries there.

The question whether this caries, or rather what is called rarifying osteitis, is a primary or secondary lesion, was difficult positively to decide. Cornil and Ranvier assert that it is secondary to fatty degeneration of the contents of the lacunæ, and subsequent inflammation and destruction of the trabeculæ in their vicinity, which then form so many centres of suppurative inflammation. While this is the opinion of one set of pathologists, others believed that inflammation precedes this fatty degeneration and may be of a simple scrofulous, tubercular, or syphilitic origin. At all events, the symptoms described by authors who have written on this disease would indicate, in the separation of the dento-alveolar structures, the channelling of the sockets and disappearance of their bony walls, that one form at least was probably due to alveolar caries.

It seemed very uncertain whether the deposition of tartar was not, in many cases, a result rather than a cause of the disease ; the dark coloured and hard tartar was always found in much less

quantities than the softer and white variety, and probably had been slowly deposited and stained in some manner due to this longer exposure of its surface. This dark tartar, too, was much more frequently found at the necks of the upper teeth than was the white variety. It was also found on the denuded fangs of teeth, which denudation, again, had probably been brought about by a form of alveolar caries, possibly without suppuration, as this was known to occur in other parts of the skeleton, and sometimes appeared more like ordinary absorption of the bone than any other form of disease.

Mr. WILSON said he quite agreed with what Dr. Smith had just said. The initiative was always periostitis, followed by disintegration of the alveoli, so that it might be the result of either local or constitutional causes.

He had lately advised the use of the powder recommended to their notice by Mr. Macleod, but could not yet say with what success.

Mr. MACGREGOR said he had used Mr. Macleod's prescription in one or two cases, and had found most marked and beneficial results following its use.

Mr. DURWARD spoke favourably of the sulphur powder, and said he had also found it a good powder for use where artificial teeth were worn above stumps.

Mr. C. W. WATSON thought that if this mixture advocated by Mr Macleod, used as a tooth powder, gave satisfactory results in the treatment of pyorrhœa alveolaris, it would be a great boon to us, as our patients would be able to take in hand their own treatment. In this disease, there is a pocketing of the gum round the teeth, softening and destruction of bone at alveolar margins, and an oozing out of a serous or sero-purulent secretion, which is laden with micro-organisms—bacteria, micrococci and bacilli (allied to algæ). This secretion seems to be derived from the connective tissue of the parts, and is thought to induce the same condition in adjacent healthy teeth by infection. He had tried to produce the disease in the dog by scraping its gum and spreading some of the secretion over it, but failed to get any result, though this might not be the case were a human subject inoculated.

The first step in the treatment of this disease is to scrape the softened bone and remove all the tartar, which, however, is

not always present. In reference to this tartar, there is a variety found pretty far up on the root, of a dark greenish colour—especially in cases where there has been considerable destruction of the bone at the alveolar margin. This was, he thought, derived from the exudate and not from the saliva.

The same condition was observed, as a result of chronic alveolar abscess, where no sinus was present, and he had repeatedly found, on extracting such teeth, nodules of this dark tartar at or near the apex of the root, where no saliva could possibly reach.

The presence of micro-organisms in the secretion of the gum pockets must tend to keep up a great amount of irritation, if they are not the direct carriers of infection themselves, and it is, therefore, important to get rid of them as soon as possible.

They are divided into two groups—ærobian, those requiring oxygen for their development; and anærobian, those that do not require oxygen for their development. A mixture of hydrogen peroxide and hydrargyri perchloridi, injected repeatedly into the gum pockets, destroys both varieties, and this should be followed up with aromatic sulphuric acid, to cause granulation of diseased parts. This treatment, carried out every three or four days for several weeks, generally results in a speedy cure. It was to be hoped, however, this new cure would render this somewhat elaborate process unnecessary.

Mr. AMOORE, in reference to Mr. Watson's recent remark, that the presence of tartar is not invariable in this disease, said he remembered Mr. C. S. Tomes citing a case in point during a discussion which bore largely upon this subject, at the International Medical Congress of 1881. It was the case of a patient aged 25, in which he extracted all the remaining teeth, and on many, which were distinctly affected, there was no trace of tartar. He had also heard the suggestion respecting the serous origin of the hard greenish variety once or twice before, and he thought he was right in referring it on one occasion to Mr. Coleman in one of his lectures. He (Mr. Amoire) had found it very high up on the roots of teeth, very commonly upon badly inflamed stumps, apparently beyond the reach of the saliva, though he could not recall having found any directly enclosed in an abscess sac.

The Third Ordinary Meeting of the Society was held on January 13th, the President, Mr. BOWMAN MACLEOD, in the chair.

The paper for the evening's consideration was entitled :—

A FEW NOTES ON ALVEOLAR HÆMORRHAGE.

By JAMES M. NICOL, L.D.S.Edin.

The object of the present paper is rather to act as the starting-point of a good and thorough discussion upon the subject of Alveolar Hæmorrhage, and to elicit the opinions of those members who, from long experience, have a right to offer them, than to contribute anything either new or startling. That it is an important question for the dental surgeon to know how to treat an obstinate case of hæmorrhage following upon tooth extraction, or any kindred operation in the mouth, all will admit; and such a Society as ours affords peculiar facilities for obtaining some definite and clear principles upon which to act in such a case.

The subject naturally divides itself into three parts, viz.:—Varieties, Causes, and Treatment.

I.—VARIETIES.

Our works on surgery divide hæmorrhage into three kinds—arterial, venous, and capillary, and in addition to this well-marked classification, various attempts have been made to classify according to the causes, and such terms as traumatic, spontaneous, active, passive, critical, periodical, have been used. These, however interesting they may be, so far as other hæmorrhages are concerned, do not enter into our calculations so far as the alveolar varieties may require our treatment.

For all practical purposes, alveolar hæmorrhages may be said to be included under the heads of Traumatic, Vicarious, and Constitutional.

(a) *Traumatic*.—In a sense, all alveolar hæmorrhages are traumatic, but it will, perhaps, be better to confine this term to the ordinary primary hæmorrhage following the extraction of one or more teeth. It is, as a rule, easy of control, and generally ceases of itself in a very short time. At the same time it may, from various causes, last so long that it becomes necessary to take means to stop it. If there be much inflammation of the surrounding tissues, primary hæmorrhage is likely to be very profuse and of some duration, owing to the vessels not contracting

so readily as when in a healthy condition ; or the profuse primary hæmorrhage may occur as the result of accident, such as a portion of the tuberosity of the upper jaw coming away in extraction of the wisdom tooth ; or a lower wisdom tooth may have its roots embracing the inferior dental artery, and may cause its rupture in extraction. These are, however, rare occurrences, and, speaking generally, the ordinary hæmorrhage following tooth extraction is not profuse or long-continued.

(b) *Vicarious Hæmorrhage*.—Probably the most frequent explanation of exceptionally profuse hæmorrhage is that it is vicarious of some other blood flow. The most common illustration of this is that of a woman having a tooth extracted at the menstrual period, when very frequently an alarming hæmorrhage will take place, and the menstrual flow be correspondingly diminished or absent altogether. Alveolar hæmorrhage may also be vicarious of epistaxis in full-blooded people who are subject to periodic attacks of bleeding at the nose. A little judicious inquiry will generally enable the operator to make up his mind upon a case of profuse primary hæmorrhage.

(c) *Constitutional*.—The hæmorrhages to which this term may be applied undoubtedly provide some of the gravest cases with which we have to deal. Fortunately they are so rare that many dentists pass through a long professional career without meeting with one. Certain constitutional conditions seem to predispose to hæmorrhage ; an anæmic condition, for instance, this being probably due to weakness of the contractile power in the vessels. Anything which tends to lower the system, as bad diet, or any chronic disease, is apt to produce a state of constitution favourable to hæmorrhage. In addition to all these, we have that special condition to which the name Hæmorrhagic Diathesis is applied, which is practically a confession of our complete ignorance as to its causes and treatment. What we do know about this state is : that it is often hereditary, that it is more frequent in males than females, but seems to be more often transmitted through the mother than the father, and that it is a congenital condition, usually manifesting itself first in early infancy ; but as to its pathology the authorities differ completely. The symptoms include a marked tendency to hæmorrhage from very slight causes, or apparently from none at all, and in many cases swelling of the joints, especially the knee joint. That which makes a patient suffering from this condition such a serious responsibility is the fact that the

primary hæmorrhage is often not at all profuse and shortly ceases. Then some time after, secondary hæmorrhage will commence, which may either be profuse from the socket of the alveolus, or may consist of a capillary oozing from the edges of the gum round the wound, this latter form being the most troublesome to stop. The case is often further complicated by the fact, that either through ignorance or carelessness, the dentist is not informed of the state of matters before the operation, or even immediately after it; and he may have extracted not one, but several teeth, thus increasing the gravity of the case a hundred-fold.

II.—CAUSES OF HÆMORRHAGE.

These have practically been dealt with under the previous head; and need not be further discussed here, except that I would like to draw attention to a possible cause which I have not seen noticed hitherto, and that is alcoholic excess. My attention was drawn to this as a possible cause during the early part of last year. I had occasion to see a patient, a man of good position, who had ruined his constitution with drink; had passed through one attack of delirium tremens, and was then under treatment for the prostration following upon that attack. The first lower molar on the left side was very loose, and causing him a good deal of irritation, so it was extracted, and as the bleeding did not seem anything more than usual, no extra precaution was taken. The hæmorrhage, however, did not cease, but continued in the form of a slow dribble all that day and night; the patient then became alarmed, and it was necessary to pay three visits in one day and plug the alveolus firmly with lint soaked in Dr. Richardson's styptic colloid, each time, before the bleeding was finally checked. After a day's intermission it broke out again, but less profusely, and after plugging again in the same manner it finally ceased. One thing struck me very much in connection with this case, and that was the appearance of the gums, tongue, and surrounding tissues—they looked and felt perfectly disorganised and rotten, and I could quite believe that a scratch of the gums or tongue might easily set up another attack of bleeding. This coincides with the well-known fact that habitual drinkers make very bad subjects for accidents or surgical operations, their wounds as a rule not healing well. Of course it is impossible to build up any theory upon one case only, but I mention it in case anyone else may have noticed a similar one.

III.—TREATMENT.

Passing now to the all-important question of treatment upon which the welfare, and perhaps the life, of a patient may depend. In the case of simple profuse primary hæmorrhage, the treatment does not generally need to be of a very vigorous order. The application of a plug of lint saturated with Dr. Richardson's styptic colloid I have generally found sufficient, accompanied by rest in the recumbent position, with the head slightly raised. Where the hæmorrhage is vicarious it will generally be very profuse, but not of long duration; and the same simple measures will, as a rule, suffice to put an end to it. With regard to the more serious secondary hæmorrhage, the socket should be first syringed well out with warm water, then small strips of lint soaked in some styptic packed firmly down into it with a small ball-headed plugger; the lint is better used in small pieces, as you are thereby enabled to take the plug out piece-meal after the bleeding has been checked; whereas if you use one large strip of lint, the operation of loosening such a large plug is very liable to start hæmorrhage again. This plug of lint should be built up so as to project above the gum and then some form of compress must be used to press it firmly and evenly. A very simple and very efficacious one can be made by taking a piece of gutta-percha tube, about three-quarters of an inch in diameter, such as is used for call-pipes, have the piece long enough to extend over one or two teeth in front and behind, slit it up one side and bend the edges apart, when it will be found to form a clumsy clamp, with a fair amount of spring in it; by means of a hot knife it can be pared to suit the shape of the jaw, and also gutta-percha can be built up on the top of it so as to meet any teeth in the opposite jaw. Let this clamp be lined with lint soaked in styptic colloid, and the edges of the gum round the plug carefully painted with a thick coating of the same styptic, then the clamp placed in position, and the patient directed to close the mouth until the teeth are about half-an-inch apart; this will allow of swallowing with a certain amount of ease, and will check any sucking of the parts, which is always to be prevented, as it only places matters where they were. As soon as the gutta-percha into which the opposing teeth bite has cooled sufficiently, the jaws should be carefully bound up and kept so for some days. Messrs. Ash & Sons' "chin appliance" for retracting the lower jaw will be

found very useful for this purpose, and is rather more sightly than an ordinary bandage. When all hæmorrhage has ceased for some days, the compress may be removed, but it is generally wiser to leave the plug for a few days afterwards, as it generally loosens slightly in that time, and can be taken out with less risk of starting the hæmorrhage once more. Should there be very few teeth left in the mouth, or none at all, I should think the best plan would be to take models, and strike upper and lower plates, to which very strong spiral springs might be attached, and the plates lined in the manner indicated above. If the patient is only kind enough to let the dentist know beforehand the danger he is running, I believe that in the great majority of cases secondary hæmorrhage can be prevented altogether by plugging the socket immediately after the operation with strips of lint soaked in the styptic colloid. It seems as if very little would check the secondary hæmorrhage at the moment of commencing, but once it gets fairly started it is much more difficult to stop. I have found several patients who announced themselves as "bleeders" give very little trouble when treated in this way. I should certainly under no circumstances extract more than one tooth at a time for a "bleeder." The multiplication of wounds only increases the difficulty of stopping the hæmorrhage. With regard to styptics; as you will have gathered, I pin my faith to Dr. Richardson's styptic colloid. It has many advantages over perchloride of iron; the latter making a nasty mess of the mouth, and even causing inflammation. Properly applied, in combination with firm pressure, I have never known the styptic colloid to fail. With regard to other local measures, the actual cautery has been tried in several cases, but with scant and only temporary success; and there is always the risk of wounding the cheek or lip in applying it. Matico leaf, tannic acid, gallic acid, and turpentine have also been tried, sometimes with success, sometimes not. In one or two cases on record, everything that could be suggested has been tried without success, and the termination has been the death of the patient. Of such a case, my old master, the late Dr. Roberts, of Edinburgh, gave an account in his paper read before this Society some years ago, and the results of that case are to be seen in the Society's museum, in the shape of an ingenious compress which he invented for checking alveolar hæmorrhage. I well remember that the gist of his teaching to his pupils in this subject was styptics

and pressure, and I am bound to say I have found his teaching correct. I have said nothing on the subject of constitutional treatment, as I consider that belongs to the medical man's department, and such a serious thing as a bad case of secondary hæmorrhage should always be treated in conjunction with the physician or surgeon. But I cannot leave the subject without referring briefly to the important point opened up by the case communicated to the Odontological Society by Mr. J. S. Turner, at one of the recent meetings, in which the patient had been prepared for the extraction by being put on a course of tincture of ergot and sulphuric acid for a week previous to the operation. It was an undoubted case of hæmorrhagic diathesis, as the patient had upon several previous occasions bled almost to death as the result of tooth extraction; on this occasion, however, although secondary hæmorrhage set in about twenty-four hours after the operation, it was of a very slight and unimportant character, and soon passed off. In this case Mr. Turner had the advantage of knowing beforehand the condition of his patient, and under similar circumstances I should certainly see the patient's medical attendant, and consult with him as to the advisability of some similar course of preventive treatment; but as it often happens that the dentist knows nothing about the danger until the operation is over, it is imperative that he should have all his apparatus ready, and at hand, for stopping all hæmorrhage.

It will be found an excellent plan to fit up a small box or bag with all the most useful requisites for arresting hæmorrhage, so that if called out at night, as has happened to the writer, you have nothing to do but lift your bag or box, and go.

One case of hæmorrhage, if it be a serious one, will be quite as much as any dental surgeon will ever wish to encounter; and after meeting with it, he will be much more likely to over-estimate the risks of prolonged bleeding than to under-estimate them.

In conclusion, I can only enforce, as the result of what little experience I have had, the great desirability of plugging the cavity at once after the extraction, before the patient has left the house, if there is any suspicion of liability to hæmorrhage. As I have pointed out, this will often prevent secondary hæmorrhage altogether, and it is the secondary hæmorrhage which is to be so much dreaded; besides, it also prevents the injudicious

attempts which the patient and friends make to stop the bleeding before calling in help; which often consist of putting the patient in front of a roaring fire, wrapped up in blankets, and administering hot drinks and mouth washes; this aggravating the very state of things which they want to stop; and, of course, the longer a case of hæmorrhage is allowed to go on before it is treated, the less likely is treatment to be successful.

In the discussion which ensued—

Mr. WILSON said, that in all ordinary cases (that is, where the blood was forming a clot) he found the mere plugging the alveolus with cotton wool soaked in Richardson's styptic, and then placing over the plug and alveolar margins a saddle of cork, thick enough to bring direct pressure to bear on both by the closure of the jaws, quite sufficient. The saddle was made to fit in as tightly as possible between the teeth on each side, so that none of the pressure was lost, which would be the case if the saddle, whether made of cork, gutta-percha, or other material, was so broad as to include these teeth.

He was thankful to say that of these cases, in which there was a want of coagulability, he had only met with one, the bleeding being set up by the patient (a boy) picking out a small morsel of a temporary root. Suspecting the patient of aggravating it by sucking, he covered a considerable surface with a gutta-percha-lined plate, and the case yielded to constitutional treatment. He decidedly objected to the use of perchloride of iron, or burnt alum, as styptics in the mouth.

Mr. MACGREGOR mentioned one or two cases which had occurred in his practice. About fourteen years ago, the late Dr. Angus Macdonald called him up about one o'clock one morning, to see a patient of his who was suffering from a severe attack of hæmorrhage from the sockets of a lower molar and bicuspid tooth, which had been extracted on the preceding day. The Dr. had, for four hours, been unsuccessfully endeavouring to arrest the flow of blood, using perchloride of iron as a styptic. Mr. M. removed the clots of blood, and syringed the part thoroughly, and applied Richardson's styptic colloid. The first application was unsuccessful, but after applying it a second time, and using considerable force in packing the cotton steeped in the styptic down into the sockets, the hæmorrhage ceased. He waited for about an hour to assure himself that no recurrence was likely, and

then left. The case was rather a serious one, as the patient was very weak and anæmic from the loss of blood, which had been considerable, and had it proved obstinate and recurred, a serious result was apprehended.

On another occasion, when putting in an artificial denture, he noticed that a loose root interfered with the adjustment of one of the clasps, and to remedy the matter, removed it with the point of an excavator. Two days afterwards, the patient returned with the blood flowing from this shallow socket. In the interim, she had been to a druggist, who had attempted to arrest it with perchloride of iron, until the mouth was perfectly blackened with it. The bleeding was stopped in a short time by a steady application of the styptic colloid.

In one instance, which occurred to him, the hæmorrhage recurred in the mouth of a patient after it had been arrested for one or two days. He had, when occasion required, used the saddle-shaped piece of cork to keep the plug in position, as referred to by Mr. Wilson, and found it very efficacious.

Mr. FINLAYSON mentioned several cases which had occurred in his practice, similar to those spoken of in Mr. Nicol's paper, particulars of which he gave to the meeting.

In treating hæmorrhage proceeding from extraction of teeth, he made sure that all clots were cleared out, these being, in his opinion, the main cause of the bleeding, as they were generally of a soft fibrinous character, containing fluid blood in their substance, and of a spongy nature, thus serving to keep the wound open. This having been accomplished, the edges of the gums were steadily and firmly pressed together with a slipping motion of the finger and thumb, and a previously prepared saddle of dry lint bound with floss silk, to prevent change of form or absorption, carefully adjusted to bring pressure to bear on the sides of the gums—more than on the top—the depth of saddle being so arranged that it came first in contact with the opposing teeth or gum. He had never plugged the socket.

In all cases, a chin bandage ought to be applied to prevent the lower jaw pressure from being removed for, at least, five or six hours—milk diet, quiet, a sitting posture, and coolness of surroundings being insisted on. Many cases of bleeding owed their origin to the administration of stimulants before or after the operation, and he had, for some years, adopted the rule of cautioning patients, either

in hospital or private practice, to avoid the latter when unusual bleeding occurred in the surgery.

Mr F. mentioned the case of a boy, eight years of age, who had taken out one of his own teeth; the resultant hæmorrhage being so profuse and continuous as to defy all treatment. Those in attendance were expecting death; the pulse being almost imperceptible, and the countenance pale to a degree. In this case the bleeding stopped short of causing a fatal result, and the boy made a rapid recovery, being seen a few weeks afterwards running about apparently well, but with that delicate complexion peculiar to those of hæmorrhagic habit. The mother was a "bleeder" also.

Leech bites had sometimes proved troublesome, but, as a rule, the cleansing away of all soft stringy clots, and the application of moistened matico, or the lunar caustic point, with immediate and continued pressure, dry lint pads being used, had always proved sufficient to stay further bleeding.

A very good internal remedy, in cases of this sort, he had found to be an acidulated solution of sulphate of magnesia, which, given every hour, acted as a depressant and astringent.

Mr. MUNRO made a few remarks to the effect, that if in a case of alveolar hæmorrhage the blood was seen to issue in small jets from the socket, or there was reason to suspect the partial rupture of a small artery, it would be advisable, before applying the plug and pressure, to pass a small sharp instrument down into the socket and completely divide it, and thus give natural hæmostatics a fair chance by allowing the inner coats of the artery to retract within the sheath, and afford a better opportunity for the blood to coagulate.

Mr. MACKINTOSH had found the styptic colloid most valuable, and had also, in one or two instances, had occasion to tie up the jaw in the manner indicated by the previous speakers. He had also found water, as hot as it could be borne in the mouth, very effectual in arresting primary hæmorrhage.

The PRESIDENT said that the paper with which Mr Nicol has favoured us is a good and interesting one is evinced by the hearty way in which its subject and premises have been discussed. Few practitioners of any length of practice but have had, at one time or other, considerable concern regarding the ultimate issue of some case of persistent or of secondary hæmorrhage. I fancy, however, if I may judge from my own experience, that there is

seldom any cause for grave apprehension, the cases being few and far between which do not yield to careful and rational treatment. I would take exception to the general statement of Mr Nicol, that where you have a predisposition to bleeding not more than one tooth should be extracted at a sitting. I find in practice, that the greater the number of teeth removed, the less proportionately is the hæmorrhage which follows, and in answer to the query, Why? I would illustrate it by analogy. Consider, for one moment, the teeth to represent so many tenements in a street, and that each house is supplied with water by branch pipes from the main. The total calibre of these branches is greater than the calibre of the main. Open one branch, the pressure is great; open two, and the pressure is reduced; open them all, and the pressure is reduced to the minimum. So with the blood-vessels, by opening more branches you reduce pressure and give every chance to the tonic and contractile powers of the vessels to close up upon the clot forming with the sheath, and making a firm and non-porous plug. The large clots, seen in bleeding cases, result from a too rapid coagulation, and are consequently porous and spongy. Hot water, as a styptic, is a very useful application, the heat of the water should be about 120 degrees Far., hotter will scald and destroy the tonicity of the vessels, as well as impair the integrity of the clot, while the action of water at, or about, 120 degrees is that it expands the vessels, encourages coagulation, and the vessels being expanded during coagulation, upon cooling down to the normal temperature contracts and compresses the clot and renders it more dense. Cold water, on the other hand, being a capital solvent of blood, encourages bleeding; when cold is applied to a bleeding vessel or surface, it must be applied in a dry form. I use a very similiar compress to that described by Mr. Wilson, using "Godiva" or "Stent" instead of cork. Within the modelled compress I place cotton wool, and super-saturate it with collodion, placing it in position, fixing the under jaw with a two-tailed bandage. This I sometimes precede with a lead and opium pill. I never plug the socket—firstly, because I obtain better results without it; and secondly, because the removal of the plug is apt to induce a recurrence of the hæmorrhage. As for Richardson's styptic, while admitting that it is an excellent styptic, I think better results are obtained by the use of *pure collodion*, the presence of the tannin either being inoperative, or if operative, it must be dissolved

from out the collodion sheath, and render it less strong and valuable as an impervious covering.

I am glad that Mr. Munro has called attention to one cause of bleeding, perhaps more frequently attending tooth extraction than we are apt to admit, viz., the rupture of some small artery. The simple cure in such a case is, as Mr. Munro has pointed out, to take a fine-pointed lancet and cut the artery through; the mouths of the severed artery will then contract and the bleeding cease.

The thanks of the Society having been given to Mr. Nicol for his most admirable paper, the meeting adjourned.

EVOLUTION IN PATHOLOGY.

MAN'S LOST INCISORS.

IN his lectures on "Evolution in Pathology," delivered at the Royal College of Surgeons of England, Mr. J. Bland Sutton, F.R.C.S., referring to the suppression of parts, said that one of the clearest instances of suppression, and at the same time one capable of indisputable demonstration, is connected with the disappearance and occasional reappearance of a third incisor tooth in man. The matter was first worked out and announced by Profesor Albrecht (now of Hamburg) in quite a number of papers, that normally man inherits three incisors on each side in the upper maxillæ, but during development the middle (second) one of the three is suppressed. In many cases of cleft palate, however, more room is afforded, and the usually suppressed tooth attains a functional condition. The question was one of importance, and I was able in a paper read before the Odontological Society of Great Britain in December, 1884,* to confirm this part of Albrecht's observation. Professor Sir W. Turner, a month later, adduced also confirmatory testimony in the *Journal of Anatomy and Physiology*, vol. xix.; and the last contribution in this direction is by Windle and Humphry in the same journal.† A careful analysis of the facts shows, beyond all doubt, that in the usual course of events an incisor tooth is suppressed in the upper maxilla of man; the only point admitting of any latitude of opinion is whether the missing tooth is the second or third incisor.

* See *Dental Record*, vol. vi., p. 34.

† *Dental Record*, vol. vi. p. 546.

As the case stands at present the balance of opinion is in favour of it being the second.

We must not forget, however, that supernumerary teeth are found in other situations than in the incisor series; indeed, they may occur in almost any part of the dental arch, and may vary in character from a perfectly formed enamel-covered tooth to a tiny conical mass of dentine. In determining whether an extra tooth is a supernumerary one or not, we must also take into consideration the fact that an excess in the number of teeth is occasionally due to the retention of one or more milk teeth. In order to comprehend the true significance of supernumerary teeth, it is necessary to bear in mind the morphology of these organs. In their essential features the teeth of a shark agree with those of a mammal, and in their development as calcified papillæ of the involuted epiblast in the buccal region—the stomodæum—the two forms are in perfect harmony. In the case of the shark almost the whole of the mouth is beset with teeth, whereas in mammals they are normally restricted to certain very definite tracts. An unprejudiced survey of the facts ought to convince us that though the teeth of mammals are thus kept within narrow limits, yet the papillæ in the immediate vicinity of these teeth territories are potentially teeth, and it is perfectly consonant with what we know of the principles of atavism that these papillæ should occasionally declare their ancestry by developing as rudimentary, or even perfect, teeth. Nor is this form of atavism limited to this particular region; for, inasmuch as teeth are modified papillæ of the skin or integumental covering (and this may be absolutely demonstrated in the case of the young of the dog-fish, in whom the various stages may be clearly traced from placoid scales to teeth), so in those remarkable teratomata arising in obsolete canals lined with epiblastic tissues, calcified papillæ (teeth) make their appearance. Dentine and enamel are tissues which exist in scanty proportions in man, yet they formerly occurred in great abundance in the remarkable mailed-ganoids which are encased in an elaborate armour of these very extraordinary tissues.

If we admit the above opinions, then a rational explanation is forthcoming of certain interesting pathological conditions which occur in the mouth. For instance, some form of odontomata may be considered as aberrant involutions of buccal epiblast and papillæ; the view is supported by the fact that this variety of

neoplasm occurs in many mammals. There is also good evidence to support the view that the milk dentition is to be regarded as a set of teeth appearing in obedience to the law of inheritance. In many mammals they are, like the lanugo of the human foetus, shed before the embryo quits the uterus. If supernumerary teeth can be regarded as atavistic, then we must consider certain pre-calcific stages of teeth in the same light; for instance, in the early stage a tooth consists of an up-growing papilla capped by a down-growth of epithelium. Suppose the development to advance no further, but growth to continue, the result is an aberrant formation—a neoplasm. Involution of this kind have been detected by Malassez, and Mr. Eve has discussed their relation in connection with multilocular cystic tumours of the jaws. The upshot of the argument is this: supernumerary teeth, odontomata (excluding the cementomata of herbivora), and multilocular cystic tumours of the jaws may be regarded as originating in the germs of teeth suppressed in the process of evolution of our species. The incisor tooth, to the consideration of which the early part of the argument was dedicated, may be considered, in all probability, as the last tooth in the order of suppression.

In addition to neoplasms originating in undeveloped enamel germs, we have to take into consideration a class of tumour usually described somewhat vaguely as adenomata, growing from the palate. Our knowledge of these cases is much advanced by the work of Mr. Stephen Paget on this subject. It appears that neoplasms, perfectly innocent in their nature, but full of epithelial nests, occur in the palate, and there are good grounds for believing that many of the growths variously described as glandular, alveolar sarcoma, alveolar carcinoma (!), &c., have their origin in little round masses of epiblast, which become enclosed between the two horizontal plates, which fuse together in the median line in order to separate the nasal and buccal cavities. The existence of such isolated epithelial islets has been affirmed by more than one observer, and a good account of them, with references to the literature of the subject, will be found in Leboucq's papers on 'Le Canal Naso-palatine chez l'Homme,' and "Note sur les Perles Epithéliales de la Voûte Palatine."

THE EFFECT OF A DIET WITHOUT LIME UPON THE TEETH.

DR. W. D. MILLER, of Berlin, communicated to the Autumn Meeting of the American Dental Society of Europe the results of his experiments upon dogs, to show the effect upon the teeth produced by the absence or presence of lime salts in their food.

His *modus operandi* was to extract a tooth from a healthy dog, and then to feed the animal upon food containing but little lime salts for three months; a second tooth being then removed, the food was changed to one containing an excess of salts. This was continued for four months, when a third tooth was extracted. From the results of chemical analysis, he found that there was an appreciable loss of lime salts in the first stage, amounting in one case to more than 1 per cent., and during the second stage that the proportion of lime salts rose to normal. The number of experiments has not been sufficient to give absolutely conclusive results, and no microscopic examinations have been made.

Mr. Charles S. Tomes, writing to the *Lancet*, says:—Far be it from me to throw cold water upon any honest experimentation, especially upon the work of an observer who has won his spurs, as Dr. Miller has, by years of careful experimental work in the field of bacteriology. Still, it appears to me that more weight has been attributed to the three experiments upon the feeding of dogs on a diet deprived of lime salts than is legitimate, and, indeed, than Dr. Miller himself claims for them. He used for analysis, at intervals, two upper canines and one lower, or *vice versa*. Dr. Galippe has shown that the specific gravities (which correspond pretty closely with the chemical composition) of corresponding teeth on the two sides of the mouth differ, as do those of the upper and lower jaws, in the same individuals. Dr. Miller's results show only small differences in the percentage compositions of the teeth during the period of his experiment, and these differences are discordant. It need hardly be pointed out that an average drawn from nine discordant analyses has not the faintest significance. If any inference as to probabilities is to be drawn from so small a number of cases, the one which suggests itself to me is that the feeding was productive of no traceable results at all upon the teeth. It is also said that it is a fact familiar to dentists that the teeth of an individual undergo alterations in character as to density, &c., at various periods during life. Everyone knows,

of course, that caries advance with very varying rapidity at various periods; but it is a mere begging of the question to assume that this is due to alterations in the teeth and not to alterations in their surroundings. This matter is, however, too wide a one to enter upon in this place, so I will only say that, personally, I have never seen any case lending support to this idea.

SOME FORMS OF DEFECTIVE SPEECH.

By WARRINGTON HAWARD, F.R.C.S., &c.

(Being part of a Clinical Lecture delivered at St. George's Hospital, and reported in the "Lancet.")

A CHILD with cleft palate uses its tongue and palatal muscles in a manner quite different from one with the natural condition of palate, and that even after a complete closure of the cleft there is still some awkwardness of speech. This varies greatly in different individuals, partly because of differences in the shape of the part, and partly because of variations in the intelligence of the learner; but all of them will be greatly assisted by proper instruction. This instruction must be directed towards unlearning the manner of using the tongue and palate which has been resorted to by the child in consequence of its cleft palate, and acquiring the right method of using these parts. It must be carried on by means of systematic lessons and practice regularly gone through day by day for months or even years; and is usually, therefore, among intelligent persons, best managed by one or other of the parents. But the parent must be taught how to proceed; and it is often of great advantage, especially in bad cases, to obtain at the commencement help of one of the teachers specially trained for teaching deaf-mutes to speak.

The plan I recommend for this, and for other defects of speech to which I shall presently allude, is as follows:—The instructor should sit directly facing the pupil; the pupil is made to fix his attention thoroughly upon the face of the teacher, and to copy slowly his method of articulation. This should be displayed by the teacher in an exaggerated degree, every movement of the lips and tongue being made as obvious as possible to the pupil, and the more difficult sounds or movements prolonged for the purpose. Thus, for instance, suppose the word "sister" were to be practised, the teacher, having filled his chest by a long

inspiration, would open his lips and draw back the angles of the mouth, so that the pupil could see well the position of the tongue against the teeth; he could then prolong the hissing sound of the "s," and finally, separating the teeth as the sound of the "t" in the second syllable issues, allows the pupil again to see the position of the tongue as the word is ended. Or, for another example, take the word "lily." Here the teacher would separate the lips and teeth, so that the tongue would be seen curved upwards, with its tip touching the hard palate; the word would then be pronounced with a prolongation of each syllable, the teeth and lips being kept open so that the uncurling of the tongue and its downward movement are clearly seen. So again, in teaching the proper method of sounding such words as "ning" or "youth," much aid is given by keeping the lips somewhat separated, so that the relation of the tongue and palate can be made manifest. The pupil must be made to fill his chest, and then to imitate as closely as possible every movement and sound of the teacher, and this may sometimes be assisted by making the pupil feel with the finger, as well as observe with the eye, the relative movement and position of the teacher's tongue and palate. There should be no other person in the room to distract the attention of the pupil. It is best to continue the exercise for a short time only, and to repeat it frequently, rather than to fatigue the child by a long lesson; and it is a good plan to take an ordinary elementary spelling-book, and to mark the words which the pupil finds most difficult to pronounce, so that these may be specially practised. I wish especially to insist upon the importance of making the pupil fix his entire attention upon the face of the teacher in all the attempts to remedy defective speech, for this does not seem sufficiently understood. Yet, if you will take an ordinary child of three years old, and tell it to repeat a difficult word after you while you stand behind it, and then make the child say the same word while it looks at your face, you will see at once the great advantage of the latter method. And this applies to adults as well as children.

Instances are occasionally met with of children with very highly arched palates who speak very much like those with cleft palates. The speech of these children may be very greatly improved by such teaching as I have described; but if they are allowed to grow up without any such aid, it becomes very difficult

to make them speak plainly. In one such case—a girl seventeen years of age—it was almost impossible for one not accustomed to the speech of those with cleft palate to understand what she said; so that at shops, railway stations, and with strangers generally, she was obliged to write down what she wished to say. She was very anxious to know if anything could be done for her by surgery; and so, after explaining to her that the operation was an experimental one, I decided to try the effect of lowering the arch of the palate by bringing down the soft parts from the hard palate (as in the operation for closing a cleft), cutting away a piece from the middle line, and then sewing the edges together again. The incision healed well, and the result of the operation was that her palate was reduced to the ordinary level. After a few weeks of practice the girl's speech very much improved; and when I saw her some months afterwards she gratefully told me that everyone could now understand her quite well, and that her friends, as well as herself, were much pleased with the improvement. Her speech was still, however, far from perfect.

OBITUARY.

WILLIAM ALFRED NEWMAN CATTLIN, F.R.C.S., L.D.S.Eng.

ON December 13th there passed away from our ranks one whose name will long be held in honour for his scientific attainments and his skill in dental surgery. No less durable will be the memory of his single-hearted and unselfish generosity, for he was ever ready to lend a helping hand whenever a claim commended itself to his judgment.

Mr. Cattlin was born at Southend in the year 1814. He was apprenticed to the late Mr. Porter, of Bishopsgate Street, London, received his medical education at the London Hospital, where he gained prizes in medicine, and was highly esteemed for his acumen and sagacity by the late Dr. Billing. He became a Licentiate of the Apothecaries' Company in 1836, a Member of the College of Surgeons in 1841, and a Fellow in 1856. He commenced practice in the City Road, London, but, on account of ill health, was compelled to abandon it and take a voyage. After his return, with renewed health and energies, Mr. Cattlin became resident medical officer at the Holloway and North Islington Dispensary, and soon afterwards, in Islington, entered upon the

practice of dental surgery, of which he had previously obtained good practical knowledge. In this branch of the profession he soon attained to eminence. He was one of the founders, and in 1866 President, of the Odontological Society. It was mainly to the untiring exertions of Mr. Cattlin that the Medical Benevolent College owes its present satisfactory basis.

In 1863 Mr. Cattlin removed to Brighton, where his great success followed him, but his health broke down under stress of work, and he retired to Bournemouth in 1880, but never recovered from the effects of an attack of paralysis, to the later effects of which, indeed, he ultimately succumbed. Mr. Cattlin's quick intelligence and decision in acting inspired confidence in his professional opinion, whilst his genial and kindly disposition gained him countless friends. He was attended, at various periods of his illness, by Mr. Jonathan Hutchinson, Dr. Hughlings Jackson, Dr. Wilks, Mr. Power and others. He leaves a widow and several children, one of whom, Mr. Wm. Cattlin, M.R.C.S., L.D.S.Eng., follows his late father's profession.—*The Lancet*.

Editorial.

REGISTRATION OF FOREIGN DENTISTS.

A QUESTION has arisen as to the technical correctness of the registration of the Foreign Dentists in the Dentists' Register. It appears that hitherto there has been a misinterpretation of Section 9 of the Dentists' Act; and it is under that Section that "Foreign Dentists" are registered. The Section requires Foreign Dentists to have been in practice in the United Kingdom, or elsewhere, for a period of ten years at the time of the passing of the Act, before their claim to registration is complete. This requirement has been overlooked; and altogether some dozen persons have been registered as Foreign Dentists, simply because they possessed a recognised foreign dental degree, and resided as the Act requires. Seven-and-a-half years have elapsed since dental registration began, and it is only now that this error has been discovered—a fact which does not indicate a too explicit phraseology and arrangement of the Dentists' Act. The subject is very annoying to those who are registered as Foreign Dentists, for each one

has been written to and requested to supply fresh data, including a statutory declaration of good character !

Whatever may be the correct interpretation of the Dentists' Act as regards foreign dentists, the Medical Council was of the decided opinion that, of the sixteen Dental Colleges in the United States of America in 1878, only two should be recognised—the dental department of Harvard and of Michigan Universities. Accordingly, the Foreign Dentists registered are all graduates of one or other of those two universities.

These foreign dentists can be divided into three groups:—

- (a) Those who are registered as having been in practice on July 22, 1878, and have registered an additional qualification—D.M.D.Harv., or D.D.S.Mich.
- (b) Those who were actually in practice in 1878, but have registered in virtue of a foreign degree only.
- (c) Those who have been registered by having obtained, since 1878, a foreign degree.

Of those of the first and second groups, there cannot be any question as to their *bonâ fide* claim to registration among the United Kingdom Dentists. The case of those of the third group is different. There are also students who have become attached to these two schools because of the prospect of eventually being able to register themselves as Foreign Dentists. But the whole question is still *sub judice*, and the decision of the Sub-Committee of the Medical Council will not be known for some time yet.

MONTHLY STATEMENT of operations performed at the two Dental Hospitals in London and at two Provincial Dental Hospitals, from January 1st to January 31st, 1887:—

Number of Patients attended...		London.	National.	Manchester.	Birmingham.
		2,413	1,762	792	840
Extractions	{ Children under 14	324	314	606	—
	{ Adults	757	504		
	{ Under Nitrous Oxide	446	460		
Gold Stoppings		295	83	26	12
Other Stoppings		783	472	45	44
Advice and Scaling		135	430	—	72
Irregularities of the Teeth		152	164	—	11
Miscellaneous		469	121	191	64
Total		3,361	2,548	948	226

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VULCANITE.

By THOMAS ROWNEY, L.D.S.Eng.

THE base of vulcanite is the elastic gum known as caoutchouc and india rubber. The former is its native name; the latter was given it after it was imported from India, and its property for erasing pencil marks had been found out. It was about the middle of the 18th century when it was first used for that purpose, and was regarded as a curiosity, and sold at the price of three shillings for a cubical piece of half-an-inch, as appears by an advertisement in a work on perspective, published in 1770.

It seems that it was known to Columbus, who saw it in Hayti, and a French traveller probably carried it home 150 years ago, and told the tale of its conversion by the natives of Brazil and the Mexican Indians into boots capable of resisting water. There is little doubt that the French were the first to use it in manufacture, though its conversion into vulcanite was the outcome of English ingenuity.

Caoutchouc is the product of several trees belonging to the orders *Euphorbiaceæ* (spurges), *Apocynaceæ* (oleanders), and others. It exists in the fluid which circulates through their lactiferous vessels, and is probably an elaborated sap which has undergone the action of air and light, the caoutchouc being the analogue of the resins which are found in the *Conifera*. The lactiferous vessels abound in the bark and leaves, and incisions are made in the former to permit the escape of the sap, which is caught in cups of clay attached to the stems.

The finest qualities of caoutchouc are obtained from the *Hevea brasiliense* and other species, which grow abundantly in the province of Para in Brazil, and in the districts about it. It is also obtained from the *Ficus elastica* and others of the same order, which grow

to a considerable size in India, and a host of inferior kinds are produced in Borneo, Madagascar, and many other countries.

It is separated from the fluid portion of the sap by dipping into it a wooden rod, having at its end a clay model. The adhering gummy layer is dried over a fire, and the dipping is repeated until a sufficient thickness of caoutchouc is obtained. It is afterwards detached by splitting it with a knife. This explains the form in which it is usually imported into England. From whatever source it is obtained it contains many impurities, which have to be removed before it can be used for manufacturing into dental rubbers. The cleansing process consists in first boiling the caoutchouc in water to soften it. It is then cut into pieces, and the larger impurities are picked out by hand. After this it is passed between a pair of metal rollers, the surfaces of which are spirally grooved in two opposite directions, leaving diamond-shaped prominences. These rollers work horizontally, and a stream of warm water flows constantly over them, washing away the dirt as it is brought to the surface. The rubber leaves this machine in the form of perforated sheets. These are hung up to dry, and are afterwards put into the masticator.

This is a hollow metal cylinder, in which revolves eccentrically a fluted roller, through which steam can be passed in order to soften the rubber. As the process proceeds, sufficient heat is generated, by friction alone, to keep the mass soft, and when the kneading is completed it comes out in the form of a roll. The rubber is then forced into metal moulds of about a cubic foot in capacity, or it may be passed at once to the mixing machine if it is to be converted into vulcanite.

In the condition in which it leaves the masticator it is affected by variations of temperature, cold hardening it, and heat making it sticky. To prevent these is the end of vulcanization.

It was in the year 53 of the present century when Charles Goodyear made the important discovery that india rubber would combine chemically with sulphur, and that the combination gave to it new and most interesting properties. He was followed in these researches by Hancock, but which of these experimenters first brought the process to perfection is a disputed point. Their plan was to immerse the sheets of india rubber in a bath of melted sulphur. But this, and all other analogous processes were uncertain, as the quantity of sulphur combining with the gum

varied so much that the results were not uniform. Eventually this plan was abandoned and sulphides of various metals, having an excess of sulphur in their composition, were substituted. These were combined mechanically with the rubber, which was afterwards subjected to a temperature varying with the result desired to be attained.

The most important of the sulphides are those of antimony and mercury, the former producing the beautiful soft sheet rubber, so well known to every gold stopper, while the latter enters largely into the composition of dental rubber as a base for artificial teeth. In both cases it is necessary that there should be a portion of free sulphur, the quantity varying with the hardness required after the compound has been subjected to heat, coffer dam rubber containing about 10 per cent., while hard vulcanite and ebonite contain at least 25 or 30 per cent. of sulphur. About thirty years ago vulcanite for dental purposes was first produced and sold in England—an ugly mass of a deep red colour, like glaziers' putty. I remember well the first pound of it I purchased on one of my visits to the metropolis, nor do I forget the vulcanizer which was sold with it, and the imperfect results obtained by using them.

About this time I began to experiment on the manufacture of vulcanite for dental purposes, feeling that something better was wanted than the material already in the hands of the profession. I had so little data on which to work, and knew so little of the material I had to work with, that numerous experiments were made before any satisfactory results were obtained, but the desired end was at last attained, and a greatly improved compound produced. While pondering the results, and maturing my plans for carrying them out on a larger scale, Child's G rubber was introduced. The sight of this beautiful preparation fired my enthusiasm, and the first leisure found me again at my work; many a night passed and often daylight surprised me at my work. I could do all but produce the singularly vivid tint which marked that rubber. Every maker of vermilion was laid under contribution, and samples were sent me from all parts of the continent of Europe. Beautiful to look at, but treacherous as apples of the Dead Sea, with few exceptions they were adulterated with chromate and bichromate of lead, and most of my results were miserable failures. Vulcanite in all sorts of forms haunted my sleep in a metamorphic puzzle; I dreamed I had brought my labour to a successful issue by the

adoption of a well known process in physical science; I woke and tried it, and my work was done. "Eureka" was written against the last formula in my register, and the manufacture of Thionite was carried out for me by one of the largest firms in England. Its composition is shown in the following formula :—

Sulphur	-	-	-	-	-	-	15
Caoutchouc	-	-	-	-	-	-	36
Vermillion	-	-	-	-	-	-	49
							<hr/>
							100
							<hr/>

The method of treating the powder, upon which its peculiar properties depended, I must leave others to work out, or speculate on, whichever best may suit them.

The incorporation of the materials is done by passing the caoutchouc through a pair of metal rollers heated by steam, and moving at unequal rates in opposite directions. When the desired softness has been obtained, the powder is sprinkled on the rubber, and the rolling is continued until a homogeneous mass is the resultant. It is next passed through the calendering machine, from which it comes in a thin layer slightly attached to a linen sheet; from this it is detached and is then cut up into any desired size by mechanical means.

The amount of mastication which the rubber undergoes considerably affects the quality of the compound. If it has been underworked, the mass will be tough and elastic, and will not pack easily; on the other hand, excessive mastication produces a weak vulcanite.

From the position thus attained in the production of dental rubber, the shoddy maker commenced his work, and, step by step, inferior qualities of it were introduced, until English dental rubber, like other English manufactures, became celebrated for their inferiority. Unable to make the best, a host of makers flooded the market with their rubbish, but there were patient workers quietly endeavouring to reach a higher standard of excellence, and the result was a pink facing rubber, the colour of which was developed by exposure to the sunshine while immersed in alcohol. It was only a soft material, in substance like leather, after it came from the vulcanizer. Its life was a short one, but it showed the possibility of improvement and marked the way for other experi-

ments. From this point I began to work with oxide of zinc as a base and followed it by substituting a sulphide of the same metal.

The sulphide of zinc I prepared by mixing the oxide and sulphur in the proportion of their equivalents, with a small excess of the latter to compensate for waste. The mixture was heated over a charcoal furnace until vapour of sulphur ceased to be evolved. The product was an imperfect sulphide mixed with some oxide. Combined with vermilion, according to the following formula, it yielded a vulcanite which hardened completely at 315 Fahr. in 75 minutes and came up a fair pink when immersed in alcohol and exposed to sunshine:—

Pale vermilion	-	-	-	-	-	14·8
Zinc sulphide	-	-	-	-	-	50·0
Sulphur	-	-	-	-	-	8·8
Caoutchouc	-	-	-	-	-	26·4
						<hr/>
						100·0
						<hr/>

While hunting for pure sulphide of zinc in the early part of 1861, Faulkner brought out, I think in July of the same year, his pink rubber. The first sample of pure zinc sulphide I purchased at a chemist's in High Holborn. It amounted to only half a pound. With it I returned to my home, and the first trial was a success; but when I received from the same house a hundred-weight of the sulphide, I was disappointed by finding that it was made by the very process which I had worked out and discarded. It was months before I found a manufacturing chemist who could supply a good sulphide. My distance from an India rubber works, and the absence of a drug grinder possessing the necessary machinery for grinding and mixing my colours, placed me at a great disadvantage. I had to entrust them to others, and they at last failed to make a good sulphide, and a large parcel of mixed colour was sent me, which proved valueless. The truth is the manufacture of sulphide of zinc was not fully understood, and it was some time before I was able to point out the subtle difference between a good and a useless sample. The microscope revealed the difference which chemistry could not detect, for that difference was structural. The good sample was amorphous, the bad was crystalline; or to be exact, its particles were arranged

—as lime particles arrange themselves when obtained from a solution in syrup—as exceedingly fine globules, transparent enough to allow the light to pass through them. It was months before the difficulty was surmounted and I was in a position to resume the manufacture. The interval I employed in further experiments, which resulted in the discovery that other colours than vermilion could be used in combination with zinc sulphide to produce a dental rubber more nearly resembling the colour of the gums, and I worked out a formula with Cryptic Red as the colorant, which yielded the most satisfactory result. But the cap of Fortunatus did not fall to my lot. It was long before I could take advantage of my results. Other workers in the same field, mounted on a Pegasus, outstripped me, while the witches were tugging at my grey mare's tail. So they reaped the harvest, while I only gleaned the stray ears. What matters it! I had the pleasure which an experimenter ever covets, as twilight steals upon his work and merges into the full daylight, when he can write after his labours "Mihi."

(To be continued.)

EXTRACTS FROM LECTURES ON OPERATIVE DENTAL SURGERY.

By WILLIAM ST. GEORGE ELLIOTT, M.D., D.D.S.

(Delivered at the National Dental College.)

(Continued from page 58.)

CARIES.

It will be our duty at this time to briefly examine the several theories as to the origin of Dental Caries. We are in possession of many more facts to-day than were our predecessors. So much is known at present, that comparatively little is left for future investigators; at the same time, those of you who have the talent and leisure for original research will be amply rewarded by taking up and fully developing some minor points. Let me briefly review what was known of caries in times past, as well as explain what the prevailing views of to-day are.

Hippocrates and men of his time referred caries to a bad condition of the humours. Faunhard (1728) distinguished several forms, as scorbutic, scrofulous, moist and dry, &c., also an external and internal cause.

Hunter (1770) regarded caries as a sort of cold gangrene. Fox considered it an inflammation of the dentine, ending in mortification.

Thomas Bell (1835), like Hunter, supposed it to be a sort of gangrene, and although recognising the external cause, explained it ingeniously by stating that the outside, being farthest removed from the nutrient supply, was first attacked.

Reynard (1838) and Linderer believed that caries was produced by chemical action.

Desirabode (1846) stated that caries was sometimes caused by local agencies; outside the tooth by chemical action, and inside by injury to the pulp.

Ficinus (1846) considered the "cuticle of the enamel" to be the soil in which caries germinated. That this decomposition was either consequent upon or had as a result a putrefactive process (which in part was caused by the presence of infusoria), which spread to the enamel cells, extracted their salts, and extending to the dentine, progressed more rapidly.

Klenke (1850) thought that caries was not always from without, but also from a central inflammatory cause; he also wrote of phyto-parasite and putrid forms.

Leber and Rottenstein (1867) denied the existence of odontitis, and attributed caries generally to the presence of micro-organisms after the softening of the tooth by acids.

Sir John Tomes first called attention to the thickened sheath surrounding the dentinal tubes as only existing in caries.

Neumann tried to prove the vital reactionary power of the dentine against the carious process, and thought Tomes's thickened sheath was an effort of nature to limit decay.

Magitot, of Paris (1880), accepts only the chemical theory, and it was he who first produced artificial caries by means of lactic acid, but did not prove it microscopically, and Leber and Rottenstein failed to verify these experiments.

Drs. Abbott, Bödecker, Heitzmann, and some other modern writers, favour the inflammatory theory, believing that the microscope gives evidence of positive pathological changes in the dentine of an inflammatory character.

I fancy they have confounded the structural defects generally associated with decay with pathological conditions.

Underwood and Mills (1881) consider that caries is absolutely dependent upon the presence and proliferation of organisms.

Dr. Miller, of Berlin, who has done more original work in this direction than perhaps any other man, has proved, experimentally, that the first stage of caries is decalcification by acids generated probably by fermentation (lactic). That in a certain fungus (lep. gig. Miller) the several forms of bacteria, bacillus and cocci are different stages of that fungus.

That carbo-hydrates or sugar are necessary to enable fungi to produce acids. That artificial caries can always be produced by inoculation of a sound tooth by a piece of carious dentine under favourable conditions as well as by the culture direct. Dr. Miller has also given us much information as to the antiseptic value of different filling materials, and has proved that many possess no value in this respect.

Ordinary amalgam fillings have little antiseptic power, but copper amalgam has a great deal; tin and gold and oxyphosphate have little, but fresh oxychloride has a marked antiseptic effect. Consequently, where we desire this effect, oxychloride should be used in preference to the oxyphosphate.

The theory generally accepted now is that caries is primarily produced by acid acting upon some defective part, or under favourable conditions, when the part is decalcified, the micro-organisms penetrate. They can and do produce acid, and thus soften a zone of dentine in advance. These micro-organisms are ferments, and are not the same as those present in the pulp canal when putrefaction is present.

Micro-organisms are the principal agents in destroying the tooth substance, first by filling and then breaking up by their numbers the tubules.

The old practice of using antiseptics, as carbolic acid, &c., is now proved to be sound, as the cavity is thus sterilized. I am in the habit of using for this purpose a two per cent. solution of bichloride of mercury in ether.

The comparative rapidity of decay is naturally governed by the relative hardness of the materials attacked, consequently enamel containing only a trace of animal matter resists decay much more effectively than dentine containing twenty-seven per cent.

Relative frequency of caries, taken from Magitot's table of 10,000 cases.

Relative frequency in the jaws is as 3 of the upper to 2 of the lower, except the molars, or in detail :—

20	Central Incisors of upper to 1 of lower.
24	Lateral „
6	Canine.
2'5	1st Bicuspid.
1'6	2nd „
0'8	1st Molar.
0'6	2nd „
0'5	3rd „

but no difference between the two sides.

Magitot's tables show a relative frequency of caries as follows :—

Lower 1st Molar.
Upper „
Lower 2nd Molar.
Upper 1st Bicuspid.
„ 2nd „
„ Lateral Incisors.
„ 2nd Molar.
„ Central Incisors.
Lower 2nd Bicuspid.
Upper Canine.
Lower 1st Bicuspid.
Upper 3rd Molar.
Lower „ „
„ Incisors.

In this brief *resumé* no attempt has been made to arrange the different theories in their precise chronological order, but enough has been said to show, first, that little was known of this disease before the present century, and indeed until within the last thirty years, and secondly, that the different theories, the inflammatory, the chemical, as well as that of organisms, are not new. The work of recent times has been more in the direction of substantiating by practical demonstration what were formerly merely theories. To those of you who wish to pursue the subject, let me highly recommend the exhaustive work of Professor Wedhl, as well as the brochure by Mr. Henry Sewill and the writings of Drs. Miller, Leber and Rottenstein, &c.

(To be continued.)

A PROFESSIONAL HOLIDAY.

By GEORGE CUNNINGHAM, B.A.Cantab., D.M.D.Harv., L.D.S.Eng.

(Continued from page 16.)

THE innate perversity of things inanimate played sad havoc with our contemplated holiday arrangements, as I was obliged to make my shortest stay in the town where I had my best introductions, and where the medical friend who had accompanied us from Cambridge had made himself familiar with the University laboratory and other interesting arrangements, while I had been roaming in Hungary. Beyond a visit to Auerbach's cellar of Faust renown and interest, where one sups amid memorials of Goethe and other German celebrities, and is compelled to drink wine or English beer (no Lager allowed), the sights of Leipzig, with its world-famous fair, which was to begin on the following day, had to be relegated to the uncertain future.

It was only when in the railway carriage, on our four hours' journey to Berlin, that we got time to decipher the German newspaper reports of the opening of the Deutsche Naturforscher und Aertze Versammlung, to which we were hurrying. It was only then we began to realize the magnitude of the Congress. On arrival in Berlin, at one o'clock in the morning, after what seemed a longish carriage drive, we found the hotel where we anticipated finding rooms full, and then began an involuntary tour of the hotels of Berlin, with always the same result—"Alles besetzt," whether it contained 70 or 700 bedrooms, the answer was always the same—"Alles besetzt." After an hour or two's physical exercise in bell-ringing and stereotyped conversations with sleepy hotel porters, it became decidedly monotonous. Despair so seized upon us that we seriously proposed to the cabman to make a contract for the hire of his vehicle for the night. It was not a commodious apartment for two, and the streets were jolty; we endeavoured, therefore, to make the cabman understand that it would be necessary to put up somewhere, but our limited knowledge of the German language did not enable us to make him fully understand, so we sought the friendly services of the porter of the Grand Hotel as interpreter. This gorgeous individual, after suggesting yet another plan which we could not possibly entertain, gave some hurried directions to our coachman, which resulted in our being transported right away to the outskirts of the town, far

from the monopolising reach of the invading Naturforscher. Here we soon found ourselves at the entrance of what seemed a fairly decent restaurant-hotel, where we were promised accommodation.

After bidding farewell to our faithful coachman, we found ourselves in a large room, which seemed a grand combination of eating-room, drawing-room, laundry-room, billiard-room, vestibule, with a bar in an alcove, and where we were requested to make ourselves comfortable until our room should be prepared. The landlord was most anxious to attend to our creature comforts, and we seemed in no way to disturb the small but convivial party which he was entertaining in that room. In the course of some time the landlady of the house appeared upon the scene, when I called my friend's attention to the fact that her appearance seemed somewhat peculiar. Between three and four in the morning a freshly-washed face and freshly-combed hair were signs rather indicative of getting up than going to bed, hence I surmised that the poor woman had got out of bed to let us get in; and on being shown to our room my surmises proved correct, so my friend had the landlady's while I had the landlord's couch, and soon, despite the sounds of revelry from the neighbouring "combination" room, we were soon oblivious to our surroundings.

We were early aroused from our deep slumbers by the noisy revels of the loud-tongued children, and soon were conscious of the awful hole into which we had got. Our first journey, therefore, was to the central office of the Congress in the large building of the Berlin University, gaily decorated for the occasion, and charmingly situated at the city end of the Unter den Linden. On presenting our cards and paying fifteen marks, we found ourselves duly received "Mitglieder," entitled to wear the gay "order"-like badge of black, white and red. Loaded with tickets for entertainments, Tageblätter, and other printed matter, we related our woes and sufferings to the clerk in charge of the register of lodgings, who provided us with a list of rooms in private houses, where he assured us we should have no difficulty in finding accommodation. Furnished with this list, we began making an inspection of the lofty upper stories of the Berlin houses. We soon found the official list was totally unreliable, and we simply spent the whole day in the vain search for accommodation.

Our adventures were sometimes of a comical nature, owing to

our limited knowledge of the language, and we can confidently recommend an experience such as I have just related as one way to get, at any rate, certain German phrases indelibly fixed on one's memory. "Vierte treppe rechts" or "Vierte treppe links," that is, four stairs up to the right or left, as the case may be, and "Alles besetzt," will not be rapidly effaced from our memory.

At length we found a resting place, and astonished Professor Miller and other friends at dinner with the narration of these exploits, which I repeat for the benefit of those who may be tempted to attend the future meetings of this great Association. The moral is evidently, make absolutely certain that you have secured rooms before going, as, if that was the result of the meeting in a large city like Berlin, what must it be in a smaller town? What would it be in bad weather?

And now about the meeting itself. The Congress would perhaps be best described as a combination of such societies as our own British Association, the British Medical and the British Dental Associations all meeting together, with general and sectional meetings. The meeting, thanks to the able presidency of Professors Virchow and Hofman, was an extremely successful one, the attendance of active members numbering 4,155, besides numerous visitors and a large contingent of ladies.

On September 18th the meeting opened with addresses from Professor Virchow, from the Under-Secretary for State, the Ober-Bürgermeister of Berlin, and the Rector of the University. Professor Virchow, in his able opening address, quoted as a marked evidence of the progress of science the necessity of incorporating several new sections in the present Congress, which, among others, included a dental section. He dwelt at considerable length upon the advantages which such a society as that founded by Alexander von Humboldt fifty-eight years ago offered, by bringing the natural scientists and the physicians into closer personal relation, and whom he regarded fellow-workers in the same field of science.

Dr. Werner Siemens, in an eloquent address, discussed the development and progress of natural science since the Society had raised the banner of free research, which was now so characteristic of the epoch that it might justifiably be denominated the age of natural science.

The address of Herr Karl Bardeleben on the "Hand and Foot" was an interesting study in comparative anatomy, in which

the development of the limbs was traced after comparison with those of mammals, birds and reptiles to their hypothetical origin in the fins of the fish.

Herr Ferdinand Cohn, of Breslau, delivered a long and interesting address on "Lebensfragen," in which he discussed some questions which have puzzled the philosopher and the scientist from the days of Aristotle. What constitutes the essence of life? How is life produced, preserved, destroyed? In what relation stands the living with the lifeless, and the living to the soul and spirit? The speaker concluded, that despite the enormous increase in our knowledge of both plant and animal life, a full and complete answer to these "life questions" could not be expected until, by the process of evolution, a race of better informed and hence wiser judges had arisen.

A large audience assembled to hear Herr Schweinfurth, of Cairo, on "Europe's Task and Prospects in Tropical Africa."

Professor Stricker was rather disappointing in his paper on the "Value of Visual Instruction," which was mainly devoted to an analysis of sensual perceptions and of his differentiation of knowledge, like the energy of the physicist into potential and kinetic. It was, however, followed by a most interesting demonstration with a new electrical microscope, which he employs largely for teaching purposes. The most minute histological details of the animal tissues were most successfully projected upon a screen, while by an ingenious arrangement of lenses, instead of the microscope attachment, an enlarged view of opaque objects could also be projected on the screen. A beautifully defined six-foot image of the ethmoid bone was a revelation of the beauty and delicacy of that structure which fairly brought down the house. In fact, so successful was the demonstration, that it had to be repeated twice to audiences of over two thousand.

Professor Hisd read a very interesting paper on the "Development of the Zoological Station at Naples, and the Increasing Want of Scientific Central Institutes." The praise he bestowed on Dr. Dohrn's admirable institute was not undeserved, as we know that the experience gained by those Cambridge students, who have occupied our University table there, has given a marked impulse to original research in animal morphology in this country. We can, therefore, confidently anticipate a considerable extension of our knowledge in this direction, when the similar institution now

rapidly approaching completion on the Hoe at Plymouth is open to our students, under the guidance of the talented officers of the Marine Biological Society.

These general meetings were held in the large and commodious Circus Renz. A large and imposing platform, draped in crimson cloth, was erected at one end of the building, and from this lofty position the various speakers addressed their enormous audience, supported by the president and a numerous contingent of secretaries, all clad in evening dress. An enormous figure of Germania stood out resplendent against a starry background of blue, cleverly illuminated by a concealed electric light of great intensity. The effect of this official installation was somewhat theatrical, and, indeed, the general gala appearance of the Congress was marked by the numerous Venetian masts, with their flags and trophies, which rendered the various places of meeting unmistakable.

The real serious business transacted was, no doubt, the work done in the various sectional meetings, of which there were thirty in all, ten being devoted to natural science pure and simple, and the remainder to various departments of medicine, surgery, and hygiene.

(To be continued.)

DISPLACEMENT OF THE INTER-ARTICULAR CARTILAGE OF THE LOWER JAW, AND ITS TREATMENT BY OPERATION.

By THOMAS ANNANDALE, F.R.S.E.,

Regius Professor of Clinical Surgery, University of Edinburgh.

THAT the proper movements of the temporo-maxillary joint may be interfered with by conditions inside the articulation is a fact recognised by all surgical authorities. That a displacement of the inter-articular cartilage—the “subluxation” of Sir Astley Cooper—may be one of these conditions is also recognised. But most modern works on surgery describe this affection as being generally due either to relaxation of the ligaments of the joint allowing a too free movement, or to inflammatory changes of a simple, gouty, or rheumatic nature. Heath* writes upon the subject thus: “It is an affection occurring principally in delicate women, and has been thought to depend upon relaxation of the

* “Injuries and Diseases of the Jaws,” third edition, p. 415.

ligaments of the joint permitting a too free movement of the bone, and possibly (though this is conjecture) a slipping of the inter-articular cartilage." Believing with Mr. Heath and other authors that inflammatory results may cause interference with the movements of this joint, I feel further convinced that, as in the case of the semilunar cartilages of the knee, the inter-articular cartilages of the temporo-maxillary joint may become displaced either from a sudden tearing of their connexions or from a gradual stretching of them.

But the chief object of this short paper is to advocate a new method of treating by operation cases of this condition which resist counter-irritation and the other means usually advised, and in which there are symptoms of a too free movement of one or both of these cartilages. The operation is upon the same principle as that which I have described and successfully carried out in connection with the displacement of the semilunar cartilages of the knee-joint. The method is as follows:—An incision, slightly curved, about three-quarters of an inch in length, is made over the posterior margin of the external lateral ligament of this joint, and is carried down to its capsule. Any small bleeding vessels having been secured, the capsule is divided, and the inter-articular cartilage is seized, drawn into position, and secured to the periosteum and other tissues at the outer margin of the articulation by a catgut suture. The following two cases illustrate the condition, and also the good result obtained by the operation suggested.

CASE I.—Mary M'C—, aged thirty-eight, was admitted into my wards on March 2nd, 1886. Nine years before her admission she injured her temporo-maxillary joints during an attack of vomiting. The joints remained "locked" for a few minutes, but after a little manipulation she herself put the condition right. Ever since this time she has suffered great discomfort in the joint upon the left side, for whenever any extra movement of the jaws was made this joint became fixed, and remained so until she had practised some manipulations, when movement returned. Frequently also, when she tried to open her mouth, she found that she could only do so to a limited extent, but by using the manipulations the proper separation of the jaws was completed. On March 12th an incision was made over the left temporo-maxillary joint, and, its capsule having been divided, the inter-articular cartilage was found to be loosened from its attachments, and much

more movable than usual. The cartilage, having been seized with artery forceps, was drawn into position, and a catgut suture passed through it and the periosteum and other tissues at the outer margin of the joint. The wound healed rapidly, and she left the infirmary on March 25th. At this time the movements of the joint were natural, and she could close and separate the jaws perfectly, without any locking or catch.

CASE 2.—Ann M——, aged eighteen, admitted on January 20th, 1885. Two years before admission, the patient when yawning found her jaws fixed. After a little manipulation she was able to close the jaws, but with a “click” on the right side. Since then she has suffered from pain and stiffness upon the left side, and the movements of the joint were constantly interfered with by something “slipping” in it. She had been treated by blistering and other remedies without obtaining any relief. On July 23rd the usual operation was performed, and the left inter-articular cartilage, being found loosened, was stitched in position with a catgut suture, as in the former case. The wound was healed at the end of a week, and she left the infirmary on July 31st, with perfect and proper movement of the jaws.—*Lancet*.

SHEDDING OF TEETH IN TABES DORSALIS.

At an ordinary meeting of the Pathological Society of London, held on February 15th, Sir JAMES PAGET, Bart., President, in the chair,

Dr. HALE WHITE read a paper on “Falling of Teeth in Locomotor Ataxy,” and related the case of a man, aged forty, who had had the first symptoms of locomotor ataxy eight years earlier; ataxy had been present for one year, and the lightning pains for nine months. When admitted taste was impaired, there was anæsthesia in various parts of the body, and girdle pain; all the reflexes were absent, there was loss of sexual power, and some diarrhœa. A wisdom tooth was exhibited which had fallen out two years ago without any previous signs of decay; it was quite healthy. The other teeth were ground down, but otherwise quite healthy. He was treated with iodide of potassium, and went out of the hospital after showing some improvement. Dr. Hale White mentioned some references to this subject. Thus, Richardière (*Rev. de Méd.*, No. 2, 1886, p. 170) related how, in a patient suffering

from tabes, the mouth and face swelled; all the teeth of the upper jaw fell out one by one without any previous caries; after this a few pieces of bone came away from the palate. Hoffman (*Berlin. Klin. Wochen.*, No. 12, 1885) mentioned a case in whom all the teeth fell out of the upper jaw without any apparent cause, and two years after tabes dorsalis showed itself. Dr. Lewis (*Amer. Journ. Nerv. and Mental Dis.*, No. 2, 1885) also gave cases. Dr. Hale White considered that before allowing that this was a definite symptom of tabes dorsalis, we should notice many more cases, for the teeth were liable to fall out from so many causes.

Dr. F. SEMON said there were two varieties of shedding of the teeth—one in which the tooth simply drops out, and in the other where part of the alveolus breaks off as well. In cases of gastric and laryngeal crisis such teeth and bone changes should be specially looked for, in view of Dr. Buzzard's theory of the association of the trophic bone centre with the pneumogastric centre.

Mr. BENNETT spoke of an affection of middle life, in which from the socket of the teeth a discharge of serum or pus took place, and in some of which cases nodules of tartar developed on the periosteum, and fragments of dead bone came away. It was an absolutely painless affection, the pathology of which was much disputed. Gout and imperfect nutrition were ascribed as causes.

Dr. G. N. PITT referred to two cases of tabes in which a larger number of teeth had been lost than was usual at the age at which the patient had arrived.

Dr. ORMEROD alluded to a case of well-marked tabes in which a part of the alveolus with three teeth had spontaneously broken off. The man had had syphilis. The neurologists considered the fracture due to tabes, but some others—syphilographers—thought the case was due to syphilis.

Mr. BLAND SUTTON referred to four cases of disease of the spinal cord in animals which had perforating ulcers and nerve troubles. They were carnivora, and all had softening of the alveolus with shedding of teeth, though they were animals who should have had a full supply of teeth.

Sir JAMES PAGET thought it was a subject of much importance, and required further investigation.

ODONTOLOGICAL SOCIETY.

THE ordinary monthly meeting was held on February 7th. Mr. C. S. TOMES, F.R.S., the newly elected President, in the chair.

Mr. D. HEPBURN (one of the Secretaries) read a letter from Mr. James Parkinson, resigning the office of Treasurer.

The PRESIDENT said, in reference to the letter which had just been read, Mr. Parkinson had, on previous occasions, talked of resigning, but had been induced to carry on his duties for a further period; however, having broken down in health, it would be useless to press his continuance of office upon him. There was no course open to them but to tender him their thanks for his services, and accept his resignation. This matter was properly the province of the Council, but the resignation of a treasurer who had filled the office so long warranted a slight digression from their rules. In connection with the subject, he might mention, and he did so with much pleasure, that the Council had been successful in inducing Mr. Thomas Arnold Rogers to undertake the duties of Treasurer. (Cheers.)

Mr. FELIX WEISS proposed that the best thanks of the Society be given to Mr. James Parkinson for his long and valuable services as their Treasurer. Mr. Parkinson had not only been with them for a considerable period, but he had performed his duties, which were sometimes delicate and difficult, with a tact and kindly consideration which had made him many friends and, he ventured to think, no enemies.

Mr. CHARTERS WHITE seconded the resolution, which was carried by acclamation.

The Curator (Mr. STORER BENNETT) reported that seven specimens had been purchased by the Council, which would be a valuable addition to the museum. Mr. Howard Mummery had also kindly given them the skull of a Japanese pug dog.

Mr. BETTS showed models of the mouth of a little boy, aged nearly 9, in which there were no permanent teeth whatever cut, nor had any of the temporary teeth been shed, except one by caries. Another interesting fact was, that several older members of the family still retained their milk molars, and the mother had only recently lost a temporary incisor. He also showed models of part of the jaw of a lady, aged about 35, who came to him

complaining of neuralgia and of a lump under the gum. Upon examination, he found the right upper canine just visible through the gum, but it was already very carious ; so much so, as to expose the pulp. He devitalized the tooth with arsenic and then filled it. He saw his patient recently, and the tooth was taking its part in the work of the jaw. This appeared proof positive that a tooth could erupt after it was dead ; in other words, it had little to do with its own eruption.

The PRESIDENT said the " casual communication " which Mr. Betts had just made was interesting, inasmuch as the tooth, which certainly had not grown, had travelled down a distance equal to the length of its crown.

Mr. STORER BENNETT read notes of a case of deep seated abscess in the neck. The patient, aged 17, was admitted to the Middlesex Hospital on December 21, 1886, and was under the care of Mr. Henry Morris. The abscess ultimately appeared to be due to an impacted wisdom tooth, although the usual signs of alveolar abscess were wanting. The face was swollen, the temperature registered 101 degrees, the right lower second and third molars were both tender on pressure, these were removed, and an ineffectual attempt was made to force the pus up through the socket of the second molar. Mr. Morris then opened the abscess, but without affording immediate relief.

Mr. WALTER COFFIN showed and explained an Antiseptic Aspirator, at the request of Dr. Rosenthal, of Liège, who had devised it. In connection with dentistry the instrument is chiefly intended for application to alveolar abscess, it is provided with a three-way valve, by means of which exhaustion and injection can be alternated with any desired rapidity, and thus pus can be pumped out from the tooth sac, and the cavity antiseptically cleansed almost simultaneously, with the result, it is said, of complete and prompt cure of the abscess. Mr. Coffin was unable to speak from personal experience as to the value of the invention.

Dr. WALKER had pleasure in saying he had used the instrument six times. In his experiments he had been able to force the pus not only through the foramen of the teeth but also through the foramen of the alveolar process. He had used it in actual practice for the last three weeks.

Mr. FREDERICK CANTON, at the request of Sir John Tomes, showed a tooth which had been sent to him by Mr. C. J. Fox,

from Ontario, Canada. The tooth was found in an ancient Indian burying ground, and was regarded by Mr. Fox as a specimen of erosion; he thought it interesting, as erosion was considered by many to be due to the use of the tooth brush, an article not to be found on the toilet table of the North-American Indian.

Mr. HOWARD MUMMERY was inclined to think that the appearance of the tooth suggested superficial caries rather than erosion.

Mr. C. D. DAVIS showed a model of the same class as that of Mr. Betts. A lady, aged 21, still retained her temporary laterals and canines. The right permanent canine was erupted, but he could find no trace of the two laterals and the other canine in the gum. He also showed models of the mouth of a girl, aged 13, who had only two lower incisors, and the second bicuspid was also absent in the lower jaw, while in the upper jaw the temporary laterals and canines were still in their place.

Mr. WILLOUGHBY WEISS showed a model of the upper jaw of a patient, aged 20, in which the permanent canines had been erupted and had taken the place of the permanent laterals, while the temporary canines were still standing.

Mr. LEONARD MATHESON said that when the Tauber Hydraulic Press was shown at the December meeting, he was asked by some of the members to test the apparatus and report upon it. The press, as most of them would remember, was for the purpose of striking up plates without the use of zinc or lead. So far, his experience had been that for simple cases it was an advantage; plates could be struck up without zinc and lead dies, and in a very much shorter time. But where there were teeth standing, especially where they were not quite short, or were separated, or in small groups, then it was necessary to use zinc and lead. In the case of repairs also it was a very rapid process, the impression was taken and the Spence metal poured in, dispensing with plaster casts; thus a plate could be struck up in an hour and a quarter. He had actually put in only three or four cases, and in these he had been extremely pleased with the perfect fit. He concluded by detailing several small matters connected with the process. Before resuming his seat he took the opportunity of referring to, at the request of Mr. Butcher, a small duct compressor for compressing the ducts on the lower jaw; the joints were loose, and it was easily adapted to almost any case.

Mr. ROBBINS, as a youthful practitioner, claimed the sympathy

of the older members, in referring to the subject of pyorrhœa alveolaris. The perusal of the paper by Mr. Whatford, of Eastbourne, published in the August, 1886, number of the *Association Journal*, had induced him to try his method himself. In November following, a case presented itself in a young lady, aged 26, of rather delicate habit, consequent upon an attack of rheumatic fever. In March, 1884, she came under his treatment for Riggs' disease. There were all the characteristics: sponginess of the gums, gaping from the necks of the teeth, tartar surrounding them, and so forth. With the ordinary treatment he got a very fair result, but the teeth were never very tight in the jaw. In November she came to him again with a lower tooth so very painful that he decided to remove it. In November last year she again presented herself, and wanted to have the two front teeth removed; he then adopted Mr. Whatford's method, which was simply packing sulphate of copper round the necks of the teeth and removing the tartar, continuing the application for nine or ten days. On the second visit the two teeth were so loose he had to hold them in; on the third visit the gums were more healthy; about the 2nd of December the case was tolerably well cured. In the end, the result was perfectly satisfactory.

Dr. FIELD had never experimented with the treatment referred to, but for several years he had used aromatic sulphuric acid. One of the most important elements in treating this disease was to get the conscientious assistance of the patient. He believed in palliative treatment, but doubted the possibility of radical cure. He had no doubt the case Mr. Robbins had related was one of true pyorrhœa alveolaris, although many that were not so were mistaken for it.

Mr. ASHLEY GIBBINGS said the subject was one which required almost an evening to itself for discussion, and he did not propose to take up the time of the Society, except to confirm Mr. Robbins as to the effects of sulphate of copper. He had not used it in such severe cases as the one just mentioned, but he had used it in two or three, in one of which it succeeded where aromatic sulphuric acid failed.

PRESIDENT'S INAUGURAL ADDRESS.

The task which custom has imposed upon each successive occupant of the Presidential Chair of this Society is one which is

beset with difficulties of a certain kind: difficulties perhaps hardly to be realised until they are encountered in the penning of an address.

For it would seem to be desirable to embody in it, if possible, something which has not been already said by one's predecessors, each of whom has thus narrowed the ground over which it might have been practicable to travel; something, too, which needs no lengthy nor detailed exposition, unsuited to the occasion, however well it might find place in a closely argued paper; a something, in fact, for which at this moment I look in vain.

In the wide field of Medicine and of Surgery this difficulty hardly exists, for a Presidential Address can almost always to good purpose concern itself with a retrospect of the progress which has been made in those directions in which thought has been most active during the preceding year; but within the sharply defined limits of our specialty, though I hope we always have progress to report, the advances have often been in the way of details, the enumeration of which would be tedious; and hence I am not disposed to adopt the time-honoured course of giving a *résumé* of the work of the year, or of a few antecedent years—not that I would for a moment set slight value upon such periodical stock-taking.

Moreover, a comfortable indulgence in a course of mutual congratulation, pleasant though it may be, is far from being a wholesome mental diet; it is a more fruitful task to seek for the weak places in our armour, if by so doing there is hope that they may be strengthened.

But if I have something to say in the way of criticism, so also there is much to be said in the way of apology for our shortcomings; and though perhaps to do so is to reverse the natural order of things, I will begin with the excuse before going on to the indictment. Year by year in the modern practice of dentistry we are able to do a little more for our patients, but our operations become longer and longer, so that it comes to pass that devoting, as we must do, hours to the treatment of each individual case, a very moderate amount of practice absorbs almost the whole of our time; whilst if we are fortunate in securing what may be termed a large practice, our time from early morning till evening is filled up with an absolute completeness which, while it may be experienced by a good many general practitioners, is unknown to all but a very few of the consultants.

And so it comes to pass that the conduct of practice is a daily burden almost too heavy for even a strong man's powers, and we are for ever struggling with a chronic lack of time, and with arrears which never get overtaken.

Add to this that our operations entail much fatigue, hours spent in constrained positions striving with manipulative difficulties, which become more irksome as the day wears on, so that after work is done there is little energy left for devotion to any matter of serious study, and it is not hard to see why it is that research has fewer devotees amongst our ranks than we would fain have found.

And there is still another factor, a very real and potent factor too, which operates adversely to research, and that is the comparatively early period at which the more promising of the new recruits to our ranks secure a full employment of their time. For thus far the growing demand for skilled dental services, together with the increased consumption of time in the performance of dental operations, has brought it about that, with few exceptions, students who have distinguished themselves above their fellows have become associated with older practitioners, and so, getting into practice years before they could possibly have made a position for themselves in the eyes of the public, have lacked that period of enforced leisure which has proved so fruitful of good work amongst young medical men. Our calling, therefore, handicaps us, and that somewhat heavily, and each one of us experiences a disposition to fall into a very deep rut of daily routine, not far short of a machine-like, automatic regularity in the performance of our daily duties.

But then it behoves us to look into it to see whether fate is altogether too strong for us, and if we cannot be saved from this form of mental deterioration; and it appears to me that there are means of escape after all, if there be the energy to grasp them. Perhaps the most valuable preventive is to have a hobby, a worthy one if possible, but at all events some hobby outside the lines of our daily work; that, however, is beyond the scope of the few remarks appropriate to the present occasion.

But besides this there is the necessity for approaching our work with thoroughly receptive minds, giving to it our very best powers, and striving to follow up every little clue, and to clear up every obscurity across which we stumble; if this be done, there will be

countless interests springing up every day, which will be a refreshment and not an added toil.

Perhaps to some this will seem a jeremiad for no cause; but let me illustrate what I mean by an example. I remember once being told that the subject was played out; that there was nothing left to work out, nothing to write about; but is it so? Is there any single thing about which we can flatter ourselves that we know it completely? Take the premature loss of the teeth, that disease which in its more acute form we call pyorrhœa alveolaris, which every dentist is treating almost every day, for the most part with poor success. Do we know all about that?—nay, more, do we know all that we could comparatively easily find out? There can be but one answer: We do not, though on both sides of the Atlantic reams of paper have been covered with *à priori* speculations and the like. To our shame be it said, we are in complete ignorance of the exact pathology of the disease, accessible though it be for study, and we treat it with a pure empiricism.

For my own part I will confess that until stirred up into inquiry by the eminently suggestive papers of Mr. Bland Sutton, who has happily often been found amongst us, though unfortunately for our credit he is not one of us, I was totally unfamiliar with the appearances which may be seen by a mere naked eye examination of dry skulls. There is, so far as I know, no place in dental literature where these appearances are noted, and *à fortiori* no record of microscopic examination of the affected bones, by which we might learn how widely the morbid process goes; and it need hardly be said researches into the conditions of the soft parts involved are equally wanting.

In the pursuit of every branch of knowledge there comes a time when that which lies upon the surface, patent to casual intelligent observation, has been worked out, and when for further progress a closer and deeper investigation becomes essential. I venture to think that if that closer investigation, with the aid of modern methods of research, were applied to our special problems, a sufficiently rich harvest of results would reward the effort.

For so it has been in the wider field of Medicine and Surgery; the immense achievements of the antiseptic method have been the outcome of investigations into the nature of organisms which, but a few years ago, would have been deemed utterly outside the pale of the interests of the practical surgeon. So too in medicine:

the nature of certain infective disorders, and the light thereby thrown upon others of which the history is as yet but incompletely known; the localisation of cerebral function, and the brilliant results which, with the aid of antiseptic surgery, have resulted therefrom, all these things have been arrived at by a closeness of investigation which has as yet hardly been brought to bear upon dental problems.

Another enticing field for enquiry, which in the nature of things does not admit of so much accuracy, lies in the question how far heredity plays a part in the genesis of dental irregularities and of dental caries. There are some irregularities which are quite obviously the result of accidental circumstances in the individual; but leaving these out of consideration there remain a vast number which *a priori* would seem to be quite as likely to be under the sway of a strict heredity as is the conformation of a nose, or of the lips.

It has been rather the habit to assume that dental irregularities are things of quite modern date; thus my friend Dr. Norman Kingsley (like Sir Crichton Browne and his headaches of School Board children) would fain persuade us that it is all the effect of disturbed innervation, the result of over-pressure. But is this so? Are irregularities so very recent? I am not at all prepared to say that we can diagnose with any certainty the existence of a dental irregularity from the appearance of the outside of the face; yet we can often make a good guess at it; as, for instance, when we see a child with open mouth and semi-idiotic look who is no idiot at all, we can guess pretty correctly that there is a contracted palate, enlarged tonsils, and maybe, too, a crop of adenoid growths in the pharynx. So if you look round the walls of the Grosvenor Gallery at the present time, where in a splendid series of portraits the unerring brush of Vandyke has handed down to us the faces of many of the cavaliers, we shall feel pretty confident that amongst them several were underhung, that one at least had protrusion of the upper incisors, and that two presented that excessive depth of the front of the lower jaw which is accompanied with much obliquity of the ascending ramus.

So too at the Old Masters' Exhibition at the Royal Academy, there are faces from which similar deductions may be drawn, and there is left upon one's mind a feeling that the mouths and lower

jaws of the cavalier classes at that date were coarser than those which would be found to prevail were we to look at the faces of persons in a corresponding class of society nowadays.

Old family portraits are of much interest looked at in this connection. I am acquainted with one family in which, with rare exceptions, the mouth is very small and the jaws contracted and V-shaped to such an extent that it is plainly discernible upon the outside of the face. Now, this appearance, forming a conspicuous part of the very marked family likeness which distinguishes them all, is clearly visible in the family portraits for many generations back.

If we stop to think what this implies it is the more remarkable, for the family portraits, the names and the titles have of course gone down by the male side only, and we have an irregularity handed down for generations hardly weakened, although there have been other influences repeatedly introduced by marriages with various other families.

I have in mind another instance where the children reproduce an apparently slight character in the father's teeth, hardly, if at all, weakened by the infusion of another strain upon the mother's side. On the other hand, I know an instance of a girl's mouth being an exact copy of her mother's, the resemblance extending to such points as the disposition of the rugæ and the grooved prominence in the median line of the palate; there is a strong facial likeness, and here the father's influence seems not to be traceable.

It may be that the terms of the problem are so complex as to altogether elude enquiry; but, nevertheless, it appears to me that a close observation of the mouths of children of large families, taken in conjunction with their parents, might not improbably throw a little light upon vastly wider questions of inheritance; at all events it is ground hardly explored, and there is here room for what Professor Tyndal has happily termed the scientific use of the imagination, in furnishing us with a working hypothesis, if with nothing more.

Hence one may be allowed to speculate a little upon matters which do not admit of more accurate proof, always provided that one is not thus led into mere speculation where more solid ground is accessible to us. One thing which has often struck every one who looks much at old portraits is, that the type of face which is

held to be beautiful at one period is not that which is held to be so at another ; the beauties of King Charles's day are not like those of the Georgian era, and neither again would be considered great beauties nowadays. There is a fashion in beauty as in other things, and the tendency of late years seems to have been in the direction of the appreciation of a tapering form of face in which the mouth and lower jaw are not pronounced to the full ; the full mouths and somewhat heavy lower part of the face of Charles's favourites would disqualify many of them somewhat from a place in a modern book of beauty.

I need hardly remind my hearers how largely the contours of the superior and inferior maxillary bones model the face, so that if there be a general facial resemblance, this will have been largely contributed to by resemblance in the form of these bones. And if dental irregularities go hand in hand, as I believe they very commonly do, with modifications of the maxillæ affecting a great deal more than the immediate alveolar borders, then coincidentally with the transmission of facial peculiarities we may expect to find transmission of dental irregularities.

The question of how far the child is demonstrably a mean product, sharing the peculiarities of its parents, but bringing to light again tendencies inherited from more remote ancestors, is one of the greatest interest, and it seems possible that things which admit of measurement and of reproduction in the way of casts, such as we have in the jaws and teeth, might throw some light upon it ; even if the results were quite negative, that in itself would be an important basis of fact from which to study the matter in other respects.

And it must not for a moment be supposed that it is a simple question, or that Nature yields up her secrets to casual questioners ; for in every individual many strains of blood unite, and may be expected to assert themselves to varying extents. Nor can we expect to be able to obtain a complete series of models from any one family ; as a friend suggested, the only satisfactory thing would be to obtain access to the family vaults of some stock presenting marked dental peculiarities.

With the material at present to hand we can only say that in the matter of teeth children may closely mimic either the one parent or the other ; this of course we frequently see in the matter of general likeness, save only that in the teeth it is, so to speak,

more measurable. Then, too, they may sometimes present a sort of blend; or some members may follow the one, and others the other parent; or again they may present characters not at first sight referable to either parent; it is this last which would seem to present the most fruitful field for inquiry.

Some years ago Mr. Francis Galton devised an ingenious method of, so to speak, striking an average of a number of faces, and bringing into prominence the points of resemblance by the help of photography.

If, for example, he wished to deal with five faces of members of the same family, he took the five photographs (which must roughly correspond in size and in the view of the face selected, whether full face, profile, three-quarter face, or what not) and arranged that they should in succession occupy the same spot upon a screen. Then he took a sensitised plate, requiring, say, five seconds exposure in order to give a good image, and exposed upon it in succession the five photographs for one second each; in the aggregate then the plate had been sufficiently exposed, but each individual photograph had received only a fifth of its proper exposure, and so a thing which occurred upon one only would have been so under-exposed as to leave no appreciable mark upon the negative. On the other hand, that which was common to all would be amply strong, and so his method eliminated that which was peculiar to one or two. Treating photographs of members of our Royal Family in this way he obtained a "composite" Guelph face, which, whilst it was unmistakably a Guelph, yet represented no known member of the family.

The composite thus obtained is then a generalisation of the points of community. Is it at all possible that we might in some such way combine the characters of the dentitions of a number of the same family and thus arrive at a generalised family type of jaw? Of course this is mere conjecture, a mere hint thrown out which may prove to be worthless or worse, and I shall lay myself open to the reproach of that making bricks without straw which in the opening of my address I condemned. But it is only on such opportunities as an opening address that there is a chance of airing undigested notions, so I must plead this in extenuation of my inconsistency. It is perhaps also conceivable, to go on in the same strain of conjecture, that the popular idea of beauty for the time being may have something

to do with the modification of the form of the jaws, at all events in particular classes of society. For it is very certain that the majority of people may be and are led in such matters; that we in point of fact learn to admire that which we are persistently told to admire as being really beautiful, and so popular pictures, periodicals, and the like may do much to inculcate a taste for a particular type. Now if you look round the walls of a picture gallery, if you turn over the pages of *Punch*, or look in the shop windows at the photographs of the professional beauties, you will, I think, be struck with the fact that the small-jawed type is the one now in vogue, and every man who, swayed by this unconscious prepossession in favour of this type, admires and then marries a damsel of this type has done something towards its intensification. Perhaps this idea is far-fetched, but it seems to have some residuum of possibility about it, even if it does not admit of being pressed very far.

It is a fact unfortunately only too familiar that bad teeth run in families, and this with sufficient constancy to force it upon the attention of the public. And this bad quality of tooth, which renders it almost certain to be attacked by caries early in the life of its possessor, is not by any means always associated with a low standard of general health.

It would be equally conceivable that defective tooth formation might be due to malnutrition in the individual during the period of active tooth-building, or to an inherited tendency; but in seeking to learn which is the more probable hypothesis there are one or two collateral facts which may help us.

There seems to be a certain fixity of type about teeth which renders them a little less susceptible to stunting, starving influences than the bones which support them; thus in rickets, although the maxillæ are stunted, the teeth are often full-sized; again in short-muzzled dogs the reduction in the length of the bones has not brought about a corresponding reduction in the teeth, so that these come to be crowded—a fact analogous to this being every day observed in the mouths of our patients.

Though it is difficult to describe in words the different grades or qualities of teeth with which we meet, yet we recognise with certainty by the eye those stoutly-built, dense-looking, yellowish teeth which possess such great resistant powers; and on the other hand there is a sufficiently distinct type of greyish or bluish tooth,

generally very translucent, which experience tells us is of very poor quality; whilst between these extremes are several sufficiently distinct types.

Upon the whole the colour of a tooth is not a bad index of its quality, any approximation to a greyish or greenish hue, in fact to cold colouring, being of bad import.

Now we find that quite trivial peculiarities in the teeth, such as the dwarfing of a lateral incisor, are inherited with great frequency; we find, too, that complexion, colour of hair, &c., and a vast number of other points are accurately transmitted, so why not quality of teeth? There being thus no *a priori* improbability in a type of tooth being inherited, it would be well worth while to investigate the question whether the health of the growing individual or heredity has most to do with determining the quality of the tooth substance, and as most of us have whole families passing under our notice the difficulties of obtaining data are not great.

The easiest and most certain method of recording observations is to use a "string of shades," such as Messrs. Ash sell for matching colours of artificial teeth, only the teeth upon it should be selected with reference to their representing typical strong and weak teeth, and each slip stamped with a distinctive letter. With a very trifling expenditure of time, the type of teeth presented by the father and the mother could be recorded, as well as those of the children; it would soon appear whether there was or was not any relation between them, and a negative result would by no means be without its value, for it would render more hopeful the prospect of influencing the teeth of a growing child by diet and general hygiene.

One may remark, in passing, that although the temporary teeth are, so far as appearances go, almost always of good quality, this fact does not at all militate against the permanent teeth being under the strict influence of heredity; for other race peculiarities, such as family likeness, &c., only develop themselves later on in the life of the individual, and sometimes even quite in advanced life.

Thanking you alike for the honour which you have conferred upon me in placing me in the Chair of this Society—a Chair which has been occupied by so many whom I cannot hope to emulate—and for the patience with which you have listened to this congeries

of inadequately considered and imperfectly expressed conjectures, I can only hope that during my Presidency our meetings may be profitable and interesting, and if they fail to be so it shall not be from want of endeavour upon my part.

EVOLUTION IN PATHOLOGY.

MR. J. BLAND SUTTON, F.R.C.S., in his Erasmus Wilson lectures, delivered at the Royal College of Surgeons of England, referred to Reversion or Atavism.

To the class of persistent foetal conditions belong the various forms of cleft palate, whether it vary from a bifid uvula to a cleft extending the whole length of the roof of the mouth. In fish the buccal and nasal cavities are a common chamber; in lizards and most birds the hard and soft palates are normally cleft, whilst in the young kangaroo the uvula is bifid.

In the armadillo, the duct of the submaxillary gland, soon after it leaves the gland, dilates into a salivary bladder, serving as a reservoir of some capacity. How easy it would be to say that in cysts of the mouth produced by obstruction and subsequent dilatation of the salivary ducts we have a good instance of reversion to the armadillo type (spurious reversion). The thing at once strikes us as absurd. It must not be concluded that I object to descend to fish to find reversions; on the contrary, the human body abounds in structures decidedly piscine—*e.g.* the enamel and dentine of teeth and odontomata, and our primitive cartilaginous skeleton; in the possession of membrane, bones, branchial clefts, and the like. In these cases, however, we can trace them in mammals, thence to reptiles, downwards to amphibians, and so on to fish; but if a character appears in a man which, so far as we know, occurs not in the intermediate forms, and especially those closely allied, then objection must be taken to it as being atavistic.

PASS LIST.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE following candidates passed the examination in dental surgery on 22nd, 23rd and 24th February:—Charles Herbert Buckley, Oldham; Isidore Clifford, Grosvenor Street; George

Cunningham, D.M.D., B.A.Cantab., Cambridge; Alfred Burkett Dalby, Liverpool; Kenneth Wade McAlpin, Tregunter Road, S.W.; Archibald Frederick Charles Thomson, Guilford Street; Percy Reeves Traer Harris, M.R.C.S.Eng., Penzance. Two candidates were referred.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

On February 6th, John Masters and Frederick W. Masters were admitted L.D.S.

FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

On January 18th, J. G. Biggs, Glasgow, was admitted L.D.S. Three candidates were referred.

EXAMINATION QUESTIONS.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE following questions were given at the written examination for the Diploma in Dental Surgery on February 22nd:—

ANATOMY AND PHYSIOLOGY.

1. Describe the Tongue, its muscles, vessels and nerves.
2. Describe the course and relations of the Internal Carotid Artery as far as the base of the skull.

SURGERY AND PATHOLOGY.

3. Give the causes, diagnosis, prognosis, and treatment of Post-pharyngeal Abscess.
4. Give the composition of Salivary Calculi, the symptoms which they occasion, and their appropriate treatment.

DENTAL ANATOMY AND PHYSIOLOGY.

1. Give a comprehensive definition of Teeth. What various purposes do they fulfil? Mention instances of modifications of dental tissues met with in particular groups.
2. Describe briefly the Lower Jaw and the Teeth it contains in a nine months' fœtus.
3. Describe the relation of the roots of the Teeth to the Antrum. What changes occur in the form of this cavity from early childhood to adult age?

DENTAL SURGERY AND PATHOLOGY.

1. What is Erosion of the Teeth? To what causes is it attributed, and what can be done in the way of treatment?

2. Name the Medicinal Agents used for application to exposed pulps, giving their therapeutical effect. Write prescriptions for (i) an alkaline aromatic Tooth-powder, (ii) an astringent application for the Gums.

3. What injuries to the Teeth and adjacent parts may arise from the use of Artificial Dentures, and how may these results be avoided or remedied?

GENERAL MEDICAL COUNCIL.

THE First Session of the General Medical Council, as constituted according to the Medical Act, 1886, was opened on the 15th ult., Sir HENRY ACLAND, M.D., in the chair. The Session lasted till the 23rd ult.

The PRESIDENT delivered an address, dealing with the medical progress in England during the last twenty-nine years. He concluded as follows:—

In dealing with the education of the medical student, we now are dealing with a subject which depends on some of the most difficult departments of science. For the science of medicine is in touch, on the one hand, with the science of many of the inorganic constituents of our earth, on whose nature there have of late been made fresh revelations from day to day; on the other hand, with the world of mind wherever manifested in living things. It is daily face to face with the tyranny of everlasting all-pervading law, and yet is open to every ray of light by which from time to time is darkly shown the cause of all.

It cannot overlook the actions and reactions of matter and mind. It is entangled among the mysteries of evolution and the effects of heredity. It must note the decay as well as the growth of the individual and of the races of men. It revises with unsparing hand the data on which have rested the *juvantia et lædencia* of life which had the blind faith of our fathers before experiment altered some foundations of accepted clinical fact. It has to recognise as a stern reality that in some manner the laws of all other living things are the laws by which, free will notwithstanding, we also have our being. It explores what connexion may be found in the origin and development of all living

things. It has to struggle for the alleviation, though it does not trouble itself to solve the mystery, of pain. It seeks to appreciate what are the principles of the universal pathology which underlie the life history of the vegetable world, and the bodily sufferings and the mental agonies of man and brute alike.

It is the function of this Council to represent interests intimately connected with all these topics through the seats of universal research and universal learning. It considers the long experience of the institutions which watch over the practical and beneficent exercise of the healing art, and which are in sympathy with the whole body of faithful workers among practitioners. The Council has to contract the impossible and unnecessary in education into that which is possible and necessary; it must so limit purely scientific studies that they may be directly subservient to the health and the wants of the public as distinguished from the profession of medicine—that public whose welfare is here expressly represented by the Crown. We live, in short, in a constant endeavour to advance the study of an art which ultimately will rest on science, and to insure such progress and knowledge as will give us a scientific practice not divorced from rational empiricism.

It is no slight happiness to those who have long watched the changes of our time to know that there are now in our medical schools many who, judged by the tests of love for truth, desire for knowledge, and benevolence of purpose and personal character, may stand comparison with any youths of any place, or any profession. To them belongs the task of reaping the harvest of knowledge which this age has sown, and which cannot yet be fully gathered in. Many have the temper of reverent and earnest inquirers into the order of things under which, for a little span, we have all been placed, and in which they, being in constant contact with the sufferings of other men, have deep concern. In their progress and in their lives will be the great reward of the Council of Medical Education.

The business relating to dental matters was the following:—

The Report of the Finance Committee shows the receipts and expenditure of the Dental Registration Fund for the year ending December 31st, 1886. In the receipts (£394 10s. 7d.) it will be noticed that there is again a decrease of £113 2s. 7d. over those of the previous year. On the other hand, the expenditure (£614 15s. 8d.) has been less by the sum of £98 os. 2d. The

deficiency of income for the year amounts to £221 5s. 1d., as compared with a deficiency of £206 2s. 8d. in 1885.

Sir WM. TURNER said he wished to draw attention to the subject of dental finance. In January, 1881, the Dentists' Fund amounted to £9,824; in 1883 to £9,220; in 1885 to £9,017; in 1886 to £8,445; and in 1887 to £7,465. Therefore during the six years it had sustained a diminution of £2,359. If that process went on in anything like the same proportion, the vanishing point of the fund was almost within measurable distance. This was an especially serious matter, as the dentists had no representative on the Council. The method of administration was imposed upon the Council by Act of Parliament, and he thought something ought to be done in the way of diminishing the ratio of expenses, so that a balance might be obtained between income and expenditure.

Dr. QUAIN said that if the Council wished to diminish the dental expenditure, it must be done at the expense of the medical profession. He quite agreed that some means must be adopted, if possible, to prevent a final catastrophe in connexion with the Dental Fund, but he could not see how the expenditure was to be lessened. The proportion of expenses paid by the dentists had been fixed at one-sixth, but as they were 6,000 as against 24,000 it ought to be one-fifth. The dentists were advised originally to allow the Council to appoint a board composed of eminent dentists and of some members of the Council, but the dentists expressed themselves as having so much confidence in the Council that they were perfectly willing to put the whole matter into their hands. If they had accepted the principle of the Duke of Richmond's Bill, and appointed a Dental Board, they could have worked with one-tenth part of the expensive machinery.

Dr. A. SMITH said that he believed there had only been one special meeting of the Dental Committee. On all other occasions the business had been transacted as supplemental to that of the Executive Committee.

Mr. MARSHALL thought that the dentists should be encouraged to sever themselves financially from the Medical Council. At present their registration was at a very low ebb, twenty-five or twenty-six a year, but students were coming on to the register at the rate of from seventy-five to a hundred a year, and therefore in a few years the dentists would have increased resources, and that ought to encourage them to feel that by-and-by they might be able to run alone.

The following Table shows the Results of Professional Examinations held in 1886 for Qualifications granted under the Dentists' Act.

NAME OF LICENSING BODY.	DIPLOMAS.	NATURE OF EXAMINATION.	WITH CURRICULUM.		WITHOUT CURRICULUM.		TOTAL.	
			Number Rejected.	Number Passed.	Number Rejected.	Number Passed.	Number Rejected.	Number Passed.
ROYAL COLLEGE OF SURGEONS OF ENGLAND	License in Dental Surgery	Written, Oral and Practical	11	18	0	0	11	18
ROYAL COLLEGE OF SURGEONS OF EDINBURGH	License in Dental Surgery	Written and Oral ...	3	4	0	5	3	9
FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW	License in Dental Surgery	Written, Oral and Practical	1	1	3	3	4	4
ROYAL COLLEGE OF SURGEONS IN IRELAND	License in Dental Surgery	Written, Oral and Practical	...	...	0	5	0	5
UNIVERSITY OF HARVARD	D.D.M.	Written and Practical	7	11	0	0	7	11
UNIVERSITY OF MICHIGAN	D.D.S.	Written, Oral and Practical	...	...	...	...	...	...
TOTALS			22	34	3	13	25	47

On Wednesday, February 23rd, Dr. HERON WATSON drew attention to a report in the morning papers of an application before a divisional court for a rule for a writ of mandamus directed to the Council ordering them to restore the name of Mr. Partridge to the register under the provisions of the Dentists' Act of 1878. He wished to ask whether the Royal College of Surgeons of Ireland had any explanation to afford in regard to the statement that they had withdrawn Mr. Partridge's diploma on the ground that he had advertised in the course of his business as a dentist? Whether the College required of each Licentiate in Dental Surgery that he should sign a declaration before receiving his diploma that he would not advertise or employ unworthy means of attracting public notice? And, thirdly, whether the Royal College of Surgeons of England had any similar provision against advertising?

The REGISTRAR announced that he had received a letter from the Solicitor bearing upon the subject.

The question was then discussed in private, with the result of its being referred to the Executive Committee.

EXECUTIVE COMMITTEE.

The minutes of the Executive Committee relating to dental business included the following:—

That, on payment of the prescribed fee of five shillings, the names of the undermentioned persons be restored to the Dentists' Register from which they have been erased in conformity with the provisions of Section 12 of the Dentists' Act (1878):—George Augustus Bryan; Joseph William Field; Halsted Halsted; Henry Hill; Ernest Horne; Thomas Lee; George Gilbert Liversidge; Harry Philips; George Edward Rogers; Joseph John Woodhouse.

An application was read from Alfred Edward Donegan, who in 1882 was registered as a medical student by the Scottish Branch Registrar, with the assurance that such registration was equivalent to registration as a dental student, requesting that he may now be allowed to register as a dental student, and to antedate to July, 1882, at which date he was pursuing his professional studies as a pupil with Mr. W. A. Rhodes, of Cambridge.

It was resolved that the application of Mr. Albert E. Donegan be acceded to.

An application was read from Frederick Tayler Miller, registered as a pupil on April 24, 1885, requesting that, as he passed his Preliminary Examination in June, 1883, he may be allowed to antedate to May 1, 1883, the date at which he commenced such professional study with Mr. M. E. Toomey, of Rathbone Place.

It was resolved that Mr. F. T. Miller be given permission to antedate to June 24, 1883.

The attention of the Executive Committee having been called to the fact that as, by legal opinion, a Dentist who registers (*a*) English, and (*b*) Foreign registrable Qualifications should have these separately registered as Original Qualifications in the respective and distinct lists for (*a*) United Kingdom Dentists, and (*b*) Foreign Dentists, with reference to the powers conferred on the Executive Committee to carry out the provisions of the Dentists' Act.

It was resolved that when a Dentist is registered both in the List of United Kingdom Dentists and in that of Foreign Dentists, the registration fee for the first Original Qualification by virtue of which he is entered in each such list be £5.

OBITUARY.

CHARLES ROSE, L.D.S.Eng.

WE regret to record the death of this young practitioner. He was a student at the Middlesex and the National Dental Hospitals. At the latter school he obtained several prizes, including the "Rymer" Gold Medal for General Proficiency, and a prize for Operative Dental Surgery. He obtained the L.D.S.Eng. in 1883, and since then practised with his father and elder brother at Mount Pleasant, Liverpool. Having for some time suffered from valvular disease of the heart, he died on February 12th, at the age of 28 years.

TESTIMONIAL TO DR. W. H. WAITE.

DR. WAITE having been compelled, through failure of sight, to relinquish the practice of his profession, his friends and the Council of the Midland Branch of the British Dental Association think that his efforts are worthy of recognition in a substantial form,

and have decided to mark his retirement from active practice by presenting a testimonial to him in the form of a Purse of Gold and an Address on vellum, which the Council desire should be given to him at the Annual Meeting of the Branch, which is to be held at Chester in April next.

The Council, in making this appeal to the members of the B.D.A. and the profession at large, trust there will be a hearty response, and hope that all who can will readily contribute their mite to so worthy an object.

Subscriptions will be received by A. M. Matthews, Mount Pleasant, Bradford, President; T. Murphy, Springfield, Bolton, Hon. Treasurer to the Fund; and I. Renshaw, Drake Street, Rochdale, Hon. Sec. to the Fund. Already over £135 have been subscribed.

ADDENBROOKE'S HOSPITAL, CAMBRIDGE.

THE founding of a Dental Department and the election of two dental surgeons to Addenbrooke's Hospital, Cambridge, gave rise to considerable discussion and animation locally. The Governors were not unanimous upon the desirability of establishing a dental department, but it may in fairness be said that the objections were based upon the small expense involved, rather than upon any antipathy to the proposed increased efficiency of the institution. Three candidates were nominated for election: Dr. G. Cunningham, Mr. Alfred Jones, jun., and Mr. W. A. Rhodes. Addresses were issued and advertised, though that was according to the local custom; yet it is a very unprofessional mode of conducting business of the kind.

The result of the poll was that Mr. Jones and Mr. Rhodes were elected. It is to be regretted that the institution has thus missed obtaining the services of Dr. Cunningham; and it would be well if the Governors would agree to place that gentleman upon their staff. Having three dental surgeons would ensure the department being open daily, instead of only four days in the week, as at present required.

CORRESPONDENCE.

A VICTORIAN SCHOLARSHIP.

To the Editor of the DENTAL RECORD.

SIR,—Scholarships, to be of any value, should be connected with some special institution, and I think any dental hospital might with advantage

found a Scholarship to be (as suggested) called the "Victoria Scholarship"; but I do not think it advisable or feasible, or to the advantage of our dental students, that such a scholarship should be started by a committee of dentists, or even by the B.D.A. or the Odontological Society.

It would give me the greatest pleasure to see each of the dental hospitals in the kingdom establishing an entrance scholarship, to enable the sons of poor parents to qualify without undergoing hardships during their student days that are little short of heroic.

Many a dentist has to give up the idea of making his son an L.D.S. because the cost is too great, and while I advocate strongly the keeping the fees for hospital study high, in order that good teaching may be provided, I also would gladly see some means of helping really deserving students. At one of the distribution of prizes at the Dental Hospital of London some few years ago, I called attention to the fact that an entrance scholarship was wanted at Leicester Square, but no response has been made.—Your obedient servant,

MORTON SMALE.

Dean, Dental Hospital of London Medical School.

To the Editor of the DENTAL RECORD.

SIR,—I beg to acknowledge the receipt of your letter referring to the proposed dental scholarship, open to students of the United Kingdom. The subject of dental education is one I have very much at heart, for its needs are apparent; but I regret it is impossible for me to join you in this movement. With all respect to those who favour schemes of this sort, if I could have my way, I would abolish all scholarships and kindred devices, because I regard them as distinct hindrances to real education, and as pernicious means for bringing to the front and labelling as scholars the shallow men who can only "cram," to the exclusion and neglect of the higher class of minds who believe in mental training and in digesting and assimilating what they study. When a man goes in for an educational prize of any sort, he is tempted to neglect all else and to work only in the narrow groove through which it can be obtained. The result, therefore, of this system is to do its best to cause the student to go out into the world imperfectly educated, but full of conceit in winning his prize, and preparing to trade on his sham certificate, instead of relying on real knowledge. Professions in which thinking is out of place can thrive on this sort of thing, but dentistry must have a vastly higher, sounder, broader and more thorough training than the system which deals in devices that secures the appearance without the reality of learning.—Believe me, sincerely yours,

PARSONS SHAW,

Late Warden, Victoria Dental Hospital, Manchester.

To the Editor of the DENTAL RECORD.

SIR,—The idea of a "Victorian Scholarship" in connection with Her Majesty's Jubilee is a good one. I presume it would be established by dentists, and made available for any Dental School in the United Kingdom. It would require a sum of £2,000 for this purpose, the interest of which would provide a sufficient sum for a Scholarship. I think a Committee formed for this purpose, and to draw out a scheme, would be the best course to pursue.—Faithfully yours,

Dental Hospital, Birmingham.

CHARLES SIMS.

Editorial.

THE PROGRESS OF THE PROFESSION.

THOUGH much progress has been made in advancing the social, professional, and scientific status of the Dental profession, there yet remains a vast amount of work to be done in each of those spheres of growth and development. To urge on the still further advancement of our profession is the avowed object of the present article; and an appeal is made to those in authority not longer to slumber, for opportunities are passing which may not recur in the next thirty years.

The professional status of the L.D.S. qualification of the R.C.S.Eng. is very wretched. It is a mere extra-mural diploma, and the Licentiates have no position or status on the foundation of the College. Unlike the Fellows and Members, they do not subscribe to the bye-laws of the College, nor do they agree to demean themselves honourably in the practice of the profession, and to the utmost of their power maintain the dignity and welfare of the College.

The Council of the College consequently has, practically, no control over the Licentiates in Dental Surgery. The latter are merely tacked on to the College as an outer fringe, the ornament of which may not readily be apparent to every one. A question bearing on this subject was asked at the recent meeting of the Medical Council (see p. 133). To amend this condition of the L.D.S. is desirable, and the present time offers an opportunity for so doing. A petition has been prepared for presentation to the Queen's Most Excellent Majesty in Council, praying that Members of the

College be granted certain privileges, and that "enlarged power may be given to the Council to suspend or revoke the license of any Fellow or Member on proof of discreditable conduct, whether professional or otherwise." Whilst this petition and also another for a new charter are being presented, the status of the L.D.S.Eng. could opportunely be looked after. This is, at least, one aspect in which the professional status of the L.D.S.Eng. could be improved. And as the Royal College of Surgeons of England qualifies more dental surgeons than any other Corporation, this question becomes the more important and pressing. The subject of professional advancement has yet one other presentment. The two Royal Colleges of Physicians and Surgeons are seeking powers to grant degrees, not mere qualifications as hitherto, in Medicine and Surgery. This is an issue from the movement to enable London students to obtain degrees on equal terms with the graduates of Universities in other parts of the United Kingdom. In that movement Dental Surgery has, hitherto, not been represented; yet, withal, the opportunity is passing, and those in authority have not taken action in the matter. The attention of the profession was directed to this subject in the DENTAL RECORD last year.

The several subjects to which Mr. C. S. Tomes referred in his Presidential Address before the Odontological Society present a variety of lines of investigation for the scientific worker. The field of the unknown, it need hardly be said, far exceeds the known. There is a rich harvest awaiting the reapers. Too frequently is it shown that the greatest amount of scientific work is done by those already fully engaged in ordinary professional routine; and that it is the willing horse that does most work. There is ample scope for investigation, and distinction is still available to the earnest and persevering student. Fortunately there are a few workers, but more would be welcome, and further knowledge would be hailed with delight. Much more could be written upon the subject of our professional advancement, and probably next month another phase of the question may be alluded to.

GOSSIP.

THURLEY TIGHE; or, *The Life of a Student*, by Felix Weiss, L.D.S.Eng., originally published as a monthly supplement to the DENTAL RECORD, is now ready as a separate volume and may be obtained from The Dental Manufacturing Company, Limited, 6 to 10, Lexington Street, Golden Square, W.

MR. C. A. PATTINSON, L.D.S.Eng., has been appointed House Surgeon, and Mr. James Rymer, M.R.C.S., Assistant House Surgeon, to the National Dental Hospital.

AT the Annual General Meeting of the Students' Society of the National Dental Hospital, held on January 14, Mr. Henri Weiss was unanimously elected President for the ensuing year. Mr. Willoughby Weiss, the retiring President, in his valedictory address, congratulated the Society on its present prosperous condition, and was grateful to find that on each evening during the session an interesting paper had been read.

AT the Annual Meeting of the Governors of the Chester General Infirmary, held on January 25th, His Grace the Duke of Westminster, K.G., President, in the chair, Mr. Fred. Bullin, J.P., L.D.S.Eng., having retired from the position of Honorary Dental Surgeon, which he had held for over 25 years, assumed the position of Consulting Dental Surgeon to the Infirmary, in accordance with Rule 43 of the Institution. Consequently, there is a vacancy for a Dental Surgeon.

PROFESSOR LIEBREICH, of Berlin, has observed, in the course of experiments respecting slowly-proceeding chemical reactions, that if hydrate of chloral were mixed with an alkaline solution, then was chloroform formed in the shape of a white precipitate. This reaction occurred with all alkaline solutions, only the time varied according to the alkali.

It has been shown that bars of iron, steel, copper, and brass can be welded firmly together in a few seconds by passing through their junction a very powerful electric current.

DR. LANGDON DOWN, in his Lettsomian Lectures before the Medical Society, said that in the feeble-minded the importance of the physical deformity of the palate was now generally admitted. High V-shaped palates were taken exception to, however, in some quarters. The front teeth may not be on the same plane as the molars. He did not contend that all the feeble-minded had high-arched palates, but that a large proportion of those of intra-uterine origin had this physical deformity.

MANGANESE steel, containing 12 to 14 per cent. of manganese, has peculiar properties. Sudden cooling softens this steel, and slow cooling hardens it. It has a very low electric conductivity. The tenacity of ordinary steel wire is from 80 to 100 kilogrammes per square millimetre, whilst that of manganese steel is 173·5 kilogrammes per square millimetre.

LANOLIN is the fat recovered from sheep's wool, and (Mr. Thomas Fletcher writes) for some purposes will doubtless prove of value to the dental surgeon, owing to one peculiar property it possesses in common with the well-known "goose grease," *i.e.*, its power of penetration through the skin and its rapid absorption when applied externally. Unlike goose fat, it is practically free from smell, and its value as a vehicle for the application of veratria and other similar agents will no doubt soon become generally known. Lanolin is now an article of ordinary commerce, readily obtained at a small cost, and it appears probable that in a very short time it will replace both vaseline and lard as a vehicle for external applications.

THE Second Smoking Concert of the season, under the auspices of the Student Society of the National Dental Hospital, took place in the Banqueting Room of the St. James's Restaurant, on February 16th. Mr. Henri Weiss occupied the chair, and a most amusing programme was gone through, to the evident satisfaction of the three hundred gentlemen who responded to the invitations sent out.

At a meeting of the Students' Society of the National Dental College, held on February 4th, Mr. Henri Weiss in the chair, Mr. Charles Glassington, M.R.C.S., exhibited the entire hard and soft palate and alveolar process of the superior maxilla, in which was included a venereal sarcoma recently removed from the mouth of a woman, an inmate of the Cancer Hospital, Brompton. Mr. Rymer, M.R.C.S., related his experience with cocaine in dental practice. In three cases there had been great dyspnoea and mental distress. Mr. Humby gave the description of a case of glosso-labial pharyngeal paralysis, said by the physician in charge of the case to be due to the heaviness of a complete denture with springs, which was being worn by the patient. Mr. Humby elicited that several members of the family were suffering from different forms of nervous disease, and after a few conciliatory experiments, referred the patient back to the physician, with the opinion that the dentures had nothing to do with the nervous lesion.

NEW YORK society is beginning to be agitated by the delicate question "whether professional people should be invited to receptions," and some of the few representatives of the old families, who still remain on the surface in that city, have announced that the line should be drawn at once, and that they intend hereafter to draw it rigorously. Meanwhile, the *Globe* continues, society of descent is perfectly logical and consistent in determining to exclude the aristocracy of brains, and the only marked objection to the plan is that it is absolutely impossible, under existing conditions, to carry it out.

SPEAKING of Dental Societies in America, the *Independent Practitioner* says:—Nor is it in number of societies alone that our sodality is peculiar. Our meetings are of an eminently practical character. English meetings are more decorously conducted, English dentists look more carefully after ethical matters, and at their meetings discuss questions of a broader scientific character, but our clinics and practical demonstrations are almost unknown there, and, in fact, are considered rather *infra dig*. As a consequence, English dentists know more of general science than their American brethren, but less of practical dentistry.

DR. E. A. BOGUE has been elected President of the New York Odontological Society.

IN accordance with the invitation given at the January meeting of the Odontological Society, a number of dentists gathered at the residence of Dr. Elliott, 39, Upper Brook Street, on February 7th. The afternoon was enjoyably spent in social intercourse, and clinical demonstrations were given by Drs. Croll and Elliott. It is to be hoped that this is but the first of a series of similar meetings. We all should have interest enough in our profession to make us not only willing to give up an afternoon for mutual practical improvement, but each one should be anxious to do his part. Who will be next?

SACCHARINE.—The labours of Dr. Fahlberg have invested coal tar with a new interest. It has long been known that our sweetmeats are colored with the colorants obtained from the black semi-liquid produced during the manufacture of carburetted hydrogen, and now the possibility stares us in the face that the confections themselves may be made of the saccharine obtained from the same material.

Saccharine is a white crystalline powder, soluble in warm water, possessing a sweetness more than two hundred times greater than cane sugar. It is a good antiseptic, is very stable, and passes through the human system without change. Of this last property the medical practitioner may, perchance, take advantage in the treatment of such diseases as diabetes mellitus, in which ordinary sugar is interdicted. The first steps in the manufacture of saccharine is the distillation of the coal tar at a temperature between 230° and 248° Fah., when a colorless fluid passes over and is condensed. To this the name of toluene has been given. This on being heated with sulphuric acid at a temperature of 212° Faht. is converted into toluene mono-sulphonic acid, and after neutralization with lime and soda, is converted into toluene-sulphonic chloride by the action of pentachloride of phosphorus. In this stage two chlorides are formed; one a solid, the other a liquid. From the latter, saccharine is obtained by mixing it with solid ammonium carbonate, which converts it into ortho-toluene-sulphamide. It is then oxidised with permanganate of potassa, and

the saccharine is separated by precipitation with a dilute mineral acid.

There seems to be no limit to the number of changes which can be rung on coal tar, with its high atomic valency, and substances which once were thought to be the products of living matter only are again and again evolved from it by the chemist's art. The evolutionist asks why should not some such material, in which exists all the necessary elements, yield, under the wand of the chemist, protoplasm, and if protoplasm, then a substance endowed with life. We have but, says a writer in *Knowledge*, to find out the proper way of putting these elements together.

But this done, could we ignore the part which life has already played, in giving to the elements that which they do not possess as they come from the chemist's laboratory.

IODOL.—When animal or vegetable matter containing nitrogen is subjected to destructive distillation, there passes over what is known as Dipple's oil—a brown fluid having a disagreeable odour. After purification by filtration through animal charcoal, this oil is treated with sulphuric acid and redistilled, at a temperature of 273° Fah. The result is a clear fluid of fragrant odour resembling chloroform, which is named pyrrol. Its composition is represented by the formula $C_4 H_5 N$.

Partially purified pyrrol is next heated for several hours with two and a half times its weight of potassium hydrate. The mass thus obtained is powdered and freed from all traces of oil by washing it with ether. It is then shaken up with a strong solution of iodine in anhydrous ether. At first the iodine solution is decolorized, but soon the whole mass acquires a deep yellow tint. At this point the process is stopped and the ether is evaporated. The mass is next dissolved in boiling alcohol. After filtration and concentration, it is mixed with a large quantity of water, when a copious amorphous brownish precipitate is thrown down. This is "Iodol." Its composition is $C_4 H I_4 N$ which requires 90 per cent. of iodine, the quantity which it is stated to contain. It is soluble in chloroform, ether, alcohol and acetic acid. From solution in the last, it can be obtained in bright prismatic crystals. It possesses great antiseptic properties, and materially assists the granulation of wounds. It can be heated to 212° Fah. without

decomposition. It was discovered by Drs. Silber and Ciamician, of Rome.

A VOLTAIC BATTERY is reported (says *The Chemical News*) in which ferric chloride is the excitant, with a layer of bromine at the bottom of each cell as a depolarizer. Two half-pint cells are said to decompose water most energetically, three cells of the same size to heat to whiteness two inches of fine platina wire, and four large cells—size not given—to yield an intense arc between carbon points. After three hours' action its power is slightly impaired, but on allowing it to stand a short time it fully recovers its original power. The bromine, it is stated, may be recovered by adding a small quantity of bleaching powder.

THE dentist's hand—says a contemporary journal—should know the tenderness learnt only by daily use of the brush or pencil. For the consolation of those who cannot use either, we add that the same tenderness may be acquired by frequent practice at the lathe. If the operator can chuck a black bird's egg, drill a hole through it from end to end, then cut it into two equal parts, and turn up an ivory stem, foot and nut, and fit a ring of the same material to the edge, and thus convert it into a fairy cup, he will be able to do the most delicate operation on the mouth, and at the age of sixty will not find himself in the rear of the most skilful operator.

It is with much regret that we learn of the serious illness of Sir John Tomes, F.R.S. Pleuro-pneumonia at an advanced age has a very grave aspect. It will be the earnest and universal wish of the profession that our veteran leader may shortly be restored to health and activity.

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VULCANITE.

By THOMAS ROWNEY, L.D.S.Eng.

(Continued from page 102.)

IN dental rubbers which do not require the action of light to develop their colour, *deep* vermilion is used in combination with zinc oxide, but the proportion of these pigments to that of caoutchouc, is so large that the compound has not much strength after vulcanization.

Black vulcanite consists only of caoutchouc and sulphur, usually in the proportion of three to one, and when hardened it is horn-like. The colour is not always uniform, hence it is mixed with some pigment when made for dental purposes. This diminishes its strength, but prevents its contraction, and gives it a fine uniform black tint.

The chemistry of caoutchouc and its derivatives is well understood through the labours of Payen, Faraday, Williams, Miller, and others, but of the chemistry of vulcanite little more is known than, that hydrogen sulphide is eliminated during the hardening process, and that after the action of sulphur caoutchouc is no longer soluble in bisulphide of carbon or in benzine. The former fact is one of great interest to the dental surgeon. If properly understood, it reveals to him the cause of the porosity which at times occurs in dentures where large masses of rubber have to be used. Consider for a moment the steps in the vulcanizing process. It will not be time wasted if we can learn how the trouble is with certainty to be avoided.

Sulphur melts at 114.5 Fahr., at 120 it is a limpid liquid, at 200 to 250 it becomes a dark viscous mass, and from 250 to 300 it again liquefies. Caoutchouc melts at 200, but sulphur begins its action upon it before the temperature reaches this point, and the

outer layer first becomes leathery. Dental rubber being a bad conductor of heat, the inner portion of the mass is very slowly raised to the same temperature as the outer skin, and when it has attained it, then the gas which is eliminated cannot find its way through the outer layer, and porosity is the result. The way to avoid this is to raise the temperature very slowly and keep it under 150 for at least twenty minutes. The mass in this time will be equally heated, and then the heat may be increased until 200 degrees are marked. At this point it should be maintained for at least fifteen minutes, after which the temperature may be quickly augmented until 315 is reached, beyond which there ought not to be any increase. This treatment is indicated in all cases where rubber is used in which the colorant is vermilion only. Where other preparations are used, these precautions are not so necessary, as zinc sulphide does away with the chance of porosity, by increasing the conductivity of the rubber and by giving it a more open texture by which the escape of the hydrogen sulphide is facilitated as it is formed.

The deterioration of partially sulphurized sheet rubber, of which coffer dam rubber is an example, is the result of oxidation, which converts the caoutchouc into a resinous mass, devoid of elasticity. This oxidation may be greatly delayed, if not entirely prevented, by immersion in distilled water, coupled with the exclusion of light.

The rubbers made according to the formulas given are not acted upon by strong hydrochloric acid. Nitric acid of full strength decomposes them, whether they have been hardened at 315 degrees or are soft. By the action of the latter acid a portion of the sulphur is oxidized and probably is converted into sulphuric acid. The zinc oxide is dissolved, but the vermilion is not acted upon, and further, caustic alkalies do not affect the rubber at all. From this we may reasonably conclude that mercurous sulphide cannot have a deleterious action upon the mucous membrane of the mouth.

What is the precise action of light upon dental rubbers, when immersed in alcohol is not known ; possibly oxidation takes place at the expense of the alcohol, for after it has been used for this purpose it does not burn readily in the lamp.

The colour of the rubber is also brought out by the action of light, while immersion in other fluids, as hydrogen peroxide and

distilled water, and even without immersion, light has the same effect, though its action is slower.

It would be well if some experimenter would work out this interesting subject and tell us upon which of the rays the change depended. My own experiments point to the ultra violet rays as the agents, but the results want verifying by extended study. When pure black vulcanite is immersed in water and exposed to light, it turns to a yellowish green, but slowly recovers its black tint by exposure to air alone. Its electrical properties are curious and interesting, but they are beyond the scope of the present article.

The readiness with which vulcanite can be used in prosthetic dentistry has revolutionized the dental art. No material ever lent its aid so kindly in building up a substitute for the losses consequent upon absorption, or other causes. But, unfortunately, it more than anything else has brought into the field a host of uneducated men, who trade on the credulity of the public and are to a certain extent successful in their Pindaric work. Is it not high time for every educated practitioner to show his patients results which shall differ as much from those of the common herd as the works of Millais differ from the makers of pot boilers who cover canvas with colour at so much a yard? What advance have we made in mechanical dentistry during the last ten or fifteen years? I know the majority are still travelling in the same ruts of a decade ago, without ever a new idea, as though they had got to the end of dental art. If we would maintain our position we must refine, we must be æsthetic, and we shall find there is still a public to appreciate our refinements. With vulcanite this can be done; and it must be done *con amore*.

One of the most elegant forms in which vulcanite can be employed in the construction of dentures is, I humbly think, as a palatal lining to a perforated gold plate, the latter forming the lingual surface. The steps in this process will readily suggest themselves to a good manipulator. The result is a perfect fit, needing no chamber to ensure adhesion, with the combined advantages of strength and lightness. Much, of course, will depend on the impression; this must be faultless. The impression trays invented by Rowney, of Derby, and shown by him with demonstrations at the last meeting of the Dental Association held in London, are invaluable for the purpose. With these "refrigerator trays" a better impression can be obtained in two or

three minutes than can be secured by any other means in treble the time. When two or more impressions are required, the trouble to the patient is greatly reduced, especially in cases where the mouth is very irritable.

Cunningham's invention, by which the palatal surface of a vulcanite piece can be covered with a permanent layer of gold, is a marked advance in mechanical dentistry. Maybe it is the prelude to further improvements, which shall culminate in the entire coating of vulcanite dentures with the precious metal.

The earliest form of vulcanizer sold in England for dental work consisted of an iron boiler, within which was suspended a tin cylinder closed at its lower end, the space between them containing rape oil. The piece to be vulcanized was placed in the cylinder, which was closed by a lid in which there was an orifice for the thermometer. The heating arrangement was left to the ingenuity of the user. The difficulty in maintaining an equal temperature was very great, and the results proportionately uncertain.

The first vulcanizer I used, in which super-heated steam was employed, was home-made, and was proved to 500 lbs. on the square inch. I have since tried several others, but none of them proved so satisfactory as one fitted with a pressure gauge which I purchased of the Dental Company. It has only once deceived me during years of frequent use. It was on the second or third time of working it when the gauge exhibited some vagaries which could not be accounted for on any known principles. It was evident I had in some way offended the Limping god; but it was not until I discovered in the U tube some fluid, the result of condensation, that the secret was disclosed. I have ever since taken care before closing the machine to drain off the water from this tube.

To ensure the best results in vulcanizing, the blowing-off tap should be opened for a few seconds to allow the air to escape when the thermometer marks 212 degrees. The chamber then will contain only dry steam, and the temperature indicated by the gauge will assimilate more nearly to the degree of heat marked by the thermometer.

EXTRACTS FROM LECTURES ON OPERATIVE DENTAL SURGERY.

By WILLIAM ST. GEORGE ELLIOTT, M.D., D.D.S.

(Delivered at the National Dental College.)

(Continued from page 105.)

IN the last lecture I gave you a brief account of the history and etiology of caries. We have some evidence to prove that this disease is occasionally, though rarely, self-arrested. I have met with but few cases, and as these occurred in the mouths of smokers, it may possibly be that the caries was arrested by the smoke, as Dr. Miller's experiments would go to prove. The experience, however, of almost every dentist shows that smoking does not ordinarily prevent decay.

FILLING TEETH AS A MODE OF ARRESTING CARIES.

Probably the first attempt at stopping teeth was made late in the last century, when several of the metals, in the form of foil, were used. The lead found round tea chests made in China was at one time favourably spoken of, but, owing to the superior claims of gold foil, which came into use about 1760, it rapidly fell into disuse. This lead was cut in strips, rolled into a rope, formed into pellets, and these were roughly inserted in the cavity by means of hand instruments, somewhat after the manner of soft gold foil, subsequently to be spoken of. That it must have been a good deal used is shown from the retention of the name in French.

Early in the present century a fusible metal called D'Arcet's mineral cement was largely used, particularly in France. It consisted of bismuth 8 parts, lead 5 parts, tin 3 parts; it became plastic at 212° Fahr., and was placed into the cavity when melted. Wood's metal (1860) was similar in composition, with the addition of cadmium; it melted at 140° Fahr. Small pieces were placed in the cavity and were melted by the application of heated instruments.

Tin foil came into general use about 1830, and has continued in favour up to the present time. It is more easily manipulated than gold foil, being more readily adapted and not hardening under the instrument; but for many years it has been used rather

on the score of economy than for any intrinsic value it was supposed to possess over gold. About thirty years ago 'the late Dr. Abbott, of Berlin, combined tin and gold foil, using different proportions of each, rolled up together in a rope and worked like soft foil. It was discovered after a year's trial that the two metals partially combined, forming a somewhat dense mass, in which the gold, while largely losing its colour and characteristics, imparted hardness to the whole mass. This combination of metals does not discolour the teeth, although becoming a good deal stained itself, the discoloration depending on the proportions taken. When they are used in equal quantities, the colour is not unlike amalgam, but is never mistaken for it by adepts. Strange as it may seem, those who object *in toto* to the use of amalgam, are not opposed to tin and gold. For all simple cavities, that is those having sides, where the stopping does not require contouring, and where the colour is not an objection, I consider this combination one of the best we have at our command. For an ordinary cavity it can be inserted well in less time than one can thoroughly mix amalgam and can then be finished at once, the colour being often fairly good.

The process of manipulation is as follows :—Dry out the cavity, so as not to have the view obstructed, but no particular attention need be given to moisture ; indeed, it is possible that moisture may facilitate that peculiar hardening process referred to. About one-third of a sheet each of gold and tin is rolled into a rope, cut into inch lengths. One of these pieces is carried by a hand instrument to the bottom of the cavity, and the instrument rotated somewhat on the Herbst process. Another loop or fold of equal length is then taken by the instrument and carried to the bottom in the same manner as the first, the cavity being filled in this way until the instrument cannot be forced in. The protruding portion is now condensed by malleting with a large pointed plugger, and finished with a fine cut bur. Long narrow cavities, so common on the crowns of molars, must be prepared as for soft foil, and the rope of tin and gold carried in a fold to the more distant portion of the excavation. This is then malleted into place with a foot instrument, each fold being well condensed. Care must be taken to get the cavity well filled at the end. To do this, it may be as well to resort to the old practice of piercing the filling with the wedged-shaped instrument, and enlarging by lateral force the cavity thus made. This is in

turn filled up, and the whole surface malleted as described. On account of the union of the two metals, there is no danger of small pieces becoming detached, as is the case with soft foil.

ZINC OXYCHLORIDE.

Oxychloride of zinc was first brought into notice by M. Sorel, of Italy, who used it in stucco work in 1856. It was recommended by the inventor for stopping teeth, and gradually came into use, and has continued to fill a place of some importance up to the present time, although of late years it has largely given place to the oxyphosphates. It consists mainly of zinc oxide, combined with silex, borax, alum, &c., according to the ideas of the manufacturers. The fluid is a solution of the zinc chloride in water, with or without the addition of other matters. It has the advantage over oxyphosphates in being more fluid, and thus better adapted to pivoting. My experiments in this direction, which will be described when we come to pivots and bridges, show that it is much stronger than the phosphate cements ordinarily used. Oxychloride has been found valuable as a lining in cavities having thin walls, and as an antiseptic in poorly-formed or chalky teeth, but as a filling material it is inferior to the phosphate, and is moreover, liable to give pain on introduction.

ZINC PHOSPHATES.

According to Flag, the original recipe by Ostermann was published in 1832. As at first made, it consisted of caustic lime for the powder, and anhydrous phosphoric acid for the fluid; but as now generally prepared, the powder consists of zinc oxide treated by nitric acid evaporated, calcined and pulverized, while the fluid is phosphoric acid, preferably the hard crystals, as in Poulsen's. The uncertainty in the setting of this cement, however, and the difficulty generally attending its introduction into the cavity, have caused the more easily used fluid, phosphoric acid, to be preferred. Chemically, according to Niles, the fluid varies in the proportion of hydrogen present, the meta, pyro and ortho phosphoric acid, H_2 , $2H_2$, $3H_2$.

Oxyphosphates are now largely used instead of the oxychlorides, and by many are thought to be more durable. This is not saying a great deal, for while in some mouths the preparation will last for six years, in others it will remain in place not more than six months. In my practice I only depend upon its lasting

one year. Experience will only enable one to get at the proper proportions for use. For an average filling, allow about one drop of the fluid, and mix thoroughly and at once with sufficient powder for the stopping, so that the setting may be uniform. Carefully introduce this into the prepared cavity. The essential of success is thorough dryness; the rubber dam is not generally necessary, as the tooth may be isolated by rolls of Japanese paper or napkins, and the cavity dried by the hot air syringe. It is not sufficient simply to heat the pipe of the syringe; the flame must be drawn into the tube many times, and blown into the cavity until the walls whiten by the drying process. Under-cuts are not necessary; but it is always better to have the cavity so shaped that proper protection is given to the stopping, so that undue force in mastication cannot dislodge the filling. I have not found that protection by varnish or wax after introduction has increased the durability, consequently I do not resort to it.

GUTTA-PERCHA.

Gutta-percha was first introduced for surgical splints by Dr. William Montgomerie, of the East India Service, in 1842. It is the concrete exudation of the *isonandra gutta*, gutta being the Malay name for gum or juice. It is found in the Malay Archipelago generally. I have here some of the pure gum, given to me while at Singapore by a planter, from trees on his own estate. You will see that it is almost white and soft, rather greasy in feeling, quite unlike the ordinary commercial article. The geographical distribution of the plants of the gutta family is exceedingly limited, some 7° of latitude and 20° longitude. The trees are cut down, and the juice then collected. The yield is from five to fifty pounds per tree. It is frequently adulterated by the natives before shipment. From 1854 to 1874, over 11,000,000 pounds were shipped from Singapore, thus causing the destruction of some 3,000,000 trees. Of course, at this rate, we will soon have no more gutta-percha for dental purposes; but the Indian Government has taken the matter in hand, and it is hoped that by judicious culture and a system of tapping, the supply will not only equal the demand, but we may be enabled to get what seems now impossible—a pure article.

The two great objections to the use of gutta-percha are: first, its softness, and second, its contraction when hardening. The

former defect makes it a very temporary stopping if it has to stand much mastication, and the second objection causes leakage and consequent cloudiness. Allow me to demonstrate this to you in a positive manner. We have here a large test tube (fig. 1)



FIG. 1.

on a stand some fourteen inches high, and one and a half in diameter. Across the top I have placed a bit of cardboard; through this I put a short cylinder of glass open at both ends. I now take a piece of red gutta-percha nearly as large as a walnut; this is heated, thoroughly softened and placed in the tube, and compressed by the fingers at each end. I now pour a little red ink in the smaller tube, on top of the gutta-percha; the lower end of this tube dips in the water that nearly fills the larger vessel. The contraction does not take place at once; but in the course of five minutes you will see from the other side of the room the red ink passing the gutta-percha into the water, which is now streaked with the colouring matter.

Some of you may remember that last year I made a large number of test stoppings of gutta-percha in pieces of white celluloid. After being twenty-four hours in ink, I had them sawed through, and demonstrated the leakage in every case. I have repeated these experiments with several modifications, making in all 238 stoppings, of which the following table is the result:—

TABLE OF COMPARATIVE LEAKAGE.

Kind.	No. of Stoppings.	Ordinarily filled.	Filled with small pieces.	Cavity varnished and filled while moist.	Cavity varnished dry.	Liq. gutta-percha lining.	Cavity wet.	Cavity wet & liq. G. P.	Saliva in cavity, liq. G. P.
Jacobs'	53	4	4	3	3½	—	—	—	—
Caulk's	48	3½	3½	0	0	—	—	—	—
Red	51	3	3	1	1	—	—	—	—
Hill's	49	4	4	0	2	—	—	—	—
Hill's	49	—	—	—	—	3	5	4	5

0 represents no leakage.

5 represents excessive leakage.

One of the objects of this experiment was to ascertain which was the best way of using gutta-percha. You will see by the table that, of the kinds tried, Caulk's gave the best result, and red the next. You will also notice that the experinents have proved the fallacy of packing gutta-percha as you would gold, in small pieces. They also prove that gutta-percha like, amalgam, can generally be made waterproof by varnishing the cavity before its introduction. Notwithstanding the objections, gutta-percha is one of the best materials at our command to arrest decay.

Allow me to show you a set of plastic instruments, Fig. 2,

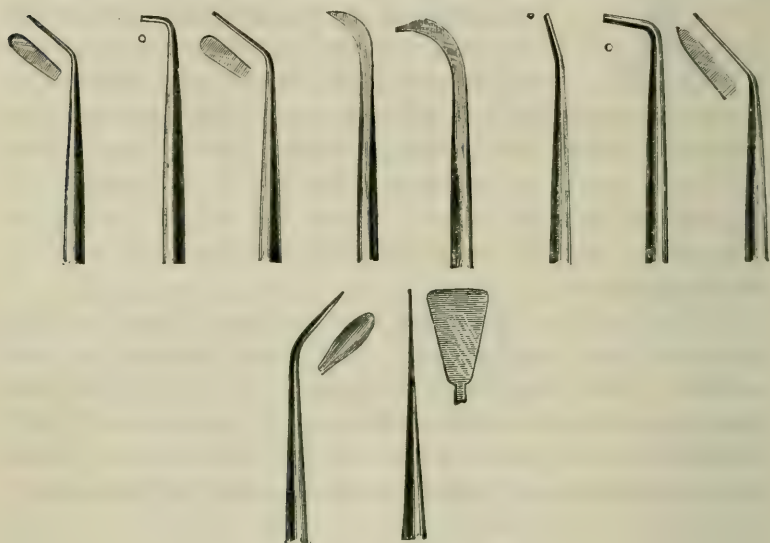


FIG. 2.

that with me fulfil all the requirements. There are ten points, each having its special use ; three that appear nearly the same vary in length and thickness.

In stopping with gutta-percha, select a piece about the size of the cavity, better smaller than larger, as it is better and easier to add small pieces than to dislodge the mass in removing the surplus. I have in the centre of my operating table a small Bunsen burner ; around, and a short distance from it, there is a heavy copper annular disc, silver-plated. The Bunsen is in the central space ; bridging over this central space is a copper rod, pivoted at one end ; as the Bunsen flame heats this bridge, the heat is conducted down both sides to the copper disc, and by turning this bridge from

side to side, the amount of heat conveyed to the disc is under perfect control. The gutta-percha to be used is placed on this disc, and when sufficiently softened, the bridge is turned to one side, thus shutting off the heat, there being enough retained in the disc to keep the piece soft for some little time. (*See cut in next Number*). To return to our subject. Take a piece about the size of the cavity to be filled, and force it into the cavity with the flat end of the straight plugger illustrated; the point used is broad and flat and should cover all or nearly all of the cavity, so that, by the pressure thus made, the gutta-percha is forced into every part. It is better now to allow a few minutes for the material to harden, when it can be trimmed either laterally by means of the flat heated instrument or direct by the hook points. The surface is now to be smoothed by rubbing with a pellet of Japanese paper or cotton soaked in chloroform.

(To be continued.)

A PROFESSIONAL HOLIDAY.

By GEORGE CUNNINGHAM, B.A.Cantab., D.M.D.Harv., L.D.S.Eng.

(Continued from page 110.)

THE unequivocal success of the new section of dental surgery must have been extremely gratifying to our German fellow-practitioners. I was struck by the business-like way in which the sittings were conducted, which was mainly due to the firm and energetic presidency of Professor Busch, the Director of the Berlin Dental Institute, though it would be ungenerous not to recognise the hearty co-operation of the various temporary occupants of the presidential chair, who were usually changed at each sitting of the section. The papers, or rather the addresses—for as a rule, each communication was more or less extempore—seemed to indicate haste in preparation in many instances.

The discussions were full of energy, and not confined to a limited circle of participants. It seemed to me that the fluency and vigorous diction of the speakers was remarkable; but that impression may have been only due to my lack of perception through my comparative ignorance of the language. The greater part of the proceedings seemed to correspond to a series of very active discussions on Incidents of Practice or "Casuals."

The members of the section amounted to sixty-seven, but as

the not very convenient lecture room in which the meetings were held was almost always quite full, there must have been a considerable number of visitors from time to time.

We arrived too late for the first sitting of the section, which was devoted to constitution, and a discussion opened by Professor Busch on the question as to how far it is permissible to remove healthy teeth for the purpose of inserting artificial dentures. The general conclusion seemed to be that it was impossible to lay down any definite rule, that each case must be determined on its merits, and that the object should be to combine beauty with efficiency in use, which must ever remain the most constant factor in coming to a determination.

I had written to Herr Herbst requesting permission to pay him a professional visit at Bremen, but as he could not accede to my proposition, since he now regards his special methods to be no longer on trial, I was glad to be in time to both hear and see him demonstrate his methods. His communication treated of (*a*) the reduction of all complex or compound to that of simple or crown cavities, (*b*) the lining of the walls of a cavity with gold for plastic fillings, so that it will have the appearance of being entirely filled with gold, and (*c*) the explanation of his various appliances. He had prepared a very complete and valuable collection of models, showing his methods of applying his innumerable ingenious appliances, also the gradual evolution of the rotation method. As an instance of his ingenuity, I might cite his "cute" appliance for keeping those troublesome far-reaching cervical cavities on front teeth dry under the rubber dam. The original clamp seemed to be made out of a steel pen point, with a considerable bulge on it, and held in position by shellac. This interesting collection he presented as a gift to the Dental Institute of Berlin, and certainly an inspection of it should not be missed by any professional visitor.

He claims that his method is very much improved, and that he now makes use of a No. 10 foil, in strips of a thickness equivalent to No. 30 (folded), besides the usual Woolrab cylinders. His instruments seem to have undergone a complete revolution, as he uses only small round-pointed stone points (garnet, I think) for rotation. His appliances for the finishing of fillings are eminently practical, as are also his application of steel ribbon and shellac, or soldered brass or German silver strips for the

reduction of compound cavities to the state of simple crown cavities.

That part of his communication in which he developed his method of lining the transparent wall in front teeth with a coating of gold, which consists of a compressed Woolrab cylinder, dipped in copal ether varnish to make it stick and to prevent amalgamation, and filling up the posterior part of the cavity with amalgam, did not excite general admiration. Professor Miller very justly pointed out the advantages of a pyrophosphate cement as a lining for such cavities, both from its better colour and from its protection and support to the frail wall.

Herr Herbst alluded in no measured strains to the success and recognition with which his rotation system had been received on his recent visit to America. He announced his method as a triumph for Germany, and concluded his address with the remark that the famous Bonwill had said "there is no more skilful dentist than Herbst."

Herr Warnekros, of Berlin, called attention to the difficulties of filling grinding surface cavities by the Herbst method. He maintained that it is a mistake to give even simple cavities a round form, and that he prefers to give them a flat box-like form. This, he urged, makes a filling easy, no matter what other method of filling is adopted, though apparently he is greatly in favor of the flat ribbon method. Great skill, he further alleged, is necessary for thorough execution by the Herbst method. His remarks were illustrated by numerous interesting diagrams, by which he sought to prove his views.

The majority of those who discussed the paper strongly criticised his "lining" methods. In his reply, Herr Herbst declared that the most difficult approximal cavities are the easiest of all which occur in the mouth, if only use is made of his method, while flat grinding surface fillings are in reality the most difficult.

Herr Herbst gave a most interesting clinic in the afternoon at the Dental Institute. It was attended with all the discomforts and inefficient arrangements to which we are habituated in our own association clinics. Being early, I secured a good place by the chair, and manfully stood the siege for two hours. The crowding, the pushing, and the insufferable heat were overpowering. In justice to the harassed operator, the helpless patient, and the eager bystanders, something surely should be done to improve

the conditions of our clinics. By the way, is it wise to thus create a special signification of the word "clinic" by applying it to practical demonstrations or to operations in the dental chair?

Herr Herbst began by explaining and demonstrating his method of using a piece of ribbon steel for the filling of approximal cavities in the front teeth. To one end of a piece of ordinary clock spring is soldered a small knob or stop, which knob being embedded in a mass of softened shellac, is pulled into position by passing the steel ribbon between the teeth to be filled. The other end of the spring is held by the hand, and may be turned to the right or to the left, as may be required. A filling executed in this way requires little polishing, except upon its anterior surface; it also has the advantage of protecting the other approximal cavity, should there be one, from the sometimes too extensive excursion of the plugger.

He next proceeded to prepare a considerable mesial crown cavity in the second upper right bicuspid, and to fill it with gold by means of the rotation method, choosing that, as he said, because it was more difficult than a similar cavity on the distal surface. After having prepared the cavity, he proceeded to adjust the matrix of thin sheet metal, which he readily cut to shape with a pair of ordinary strong scissors, and fashioned to the shape of the tooth with a peculiar form of pliers, the overlapping edges of the band on the labial aspect being held in apposition by the pliers (see February No. of *Cosmos*, 1887); the matrix was then removed without opening the pliers and soldered with ordinary soft jeweller's solder over the flame of a spirit lamp, and also strengthened by soldering on a rim of thin brass wire. The process of making the matrix did not occupy more than a few minutes. The matrix having been duly adjusted, the operation of filling began. He used the Woolrab cylinders, employing a pad of cotton wool for impressing the first of them into place. The only rotation instruments he employed were two small round-ended burnishers, consisting of a small garnet point held in a metal engine socket instrument. The instruments with which we have become familiar, as figured in articles on the Herbst method, were conspicuous by their absence. By means of hand-pressure and rotation the filling was completed, and the matrix removed.

As the results of careful observation during the whole process,

I came to the conclusion that in this operation about 75 per cent. of it was hand-pressure and 25 per cent. rotation. His strong, well-developed muscular hand and wrist, and his expert use of hand-pressure, may readily account for the greater density of this gold filling than those which I have seen executed by the rotation method in this country by other operators. Herbst claims for his method a considerable saving of time. After making every due allowance for the unfavourable conditions under which the clinic was performed, owing to the throng of onlookers and the lack of convenience and comfort in operating, the general conclusion amongst the most experienced operators present was that no saving of time was apparent. Altogether, from what I saw, I did not feel induced to begin learning a new method, which does not, after all, seem to have very much to recommend it, especially when the acquirement of that method (according to the published experience of both Mr. Herbst and Dr. Bödecker) must necessarily take a very considerable time. If, in the future, any special potency in tooth preservation by better adaptation to the cavity walls is demonstrated, not merely claimed, such a decision might have to be rescinded. I must, however, express my admiration for the various ingenious appliances which he has brought to bear in making his so-called rotation method applicable. My gratitude should indeed be considerable, inasmuch as seldom does a single day pass without my availing myself of the matrix in some form or other, and certainly the Herbst matrix, as above described, is that most commonly used, whether for filling with gold or amalgam.

(To be continued.)

DENTAL HOSPITAL OF LONDON.

THE Annual General Meeting of Governors of this Hospital was held at Leicester Square on March 10th, Mr. SAMUEL CARTWRIGHT, one of the Vice-Presidents, in the chair.

The Committee of Management presented their Twenty-ninth Annual Report, which stated that the total amount received for the General Fund during the year was £1,712 17s. 7d., and the expenses were £1,394 2s. 8d.

In consequence of the continued increase in the number of patients, it has been found necessary to further enlarge the Hospital, and plans are now being prepared for consideration,

so that the work should be carried out at the least possible expense. The Managing Committee sincerely trust that the benevolent public and friends of the Hospital will, during the Jubilee year, assist the Committee in order that the work the Hospital is doing may be still further developed.

It being twelve years since anything had been done to the brickwork and Portland cement outside the Hospital, Sir Edwin Saunders most liberally offered to contribute to the expense of these repairs, and Sir Edwin subsequently paid the entire cost of the work, amounting to £50.

Other extra charges on the finances of the charity have had to be met during the past year, viz., £20 for extra lavatory apparatus, in consequence of the large increase in the number of students and for sanitary reasons; £36 for extra operating chairs, which it was necessary to purchase, in consequence of the large increase in the number of patients; and £21 for fittings for the new stopping room.

The Committee have to express their unfeigned regret at the resignation of the Honorary Secretary, Mr. G. A. Ibbetson, a post which he held with much credit for a period of 13 years, and while thanking him for his long and valued services, are much gratified to feel that the Institution is not altogether deprived of his counsel, as he will continue to be associated with it as a Vice-President.

The Medical Committee reported a continued increase in the number of patients daily seeking relief at the Hospital, and stated that, notwithstanding the extreme overcrowding of the waiting rooms, staircase, and operating rooms which that increase had necessarily created, the patients had been noticeably anxious to assist the Hospital officials by maintaining orderly conduct and paying respectful attention to instructions, thereby showing their appreciation of the benefits conferred by the institution.

The increase in the number of operations performed during 1886 is an extremely large one, viz., 4,560; this is greatly in excess of that of any former year.

The total number of cases treated during 1886 was 43,745, and it is extremely interesting to notice that this represents about double the number of cases treated in 1874 (21,904), the first year of work after the Hospital was removed from the original building in Soho Square.

The following table shows *in extenso* the record of the various operations undertaken and carried out :—

Number of Patients ...	...	...	...	...	...	29,645
Extractions	{ Children under 14	...	...	...	...	4,613
	{ Adults	...	...	...	...	11,299
	{ Under Nitrous Oxide	...	...	...	...	7,305
Gold Stoppings	...	...	...	...	...	3,094
White Foil ditto	}	...	...	...	...	10,155
Plastic ditto						
Irregularities of the Teeth treated mechanically	...	...	...	...	...	1,427
Miscellaneous Cases...	...	...	...	...	...	4,158
Advice Cases...	...	...	...	...	...	1,694
Total...						43,745

In April, the Committee received with much regret the resignation of Mr. Henry Moon, one of the Senior Dental Surgeons. Mr. Moon had for many years been a zealous member of the staff, and he left in order to seek rest and change for the benefit of his health. On his retirement he carried with him the sincere respect and good wishes of his colleagues.

Mr. A. S. Underwood, Senior Assistant Dental Surgeon and Lecturer on Dental Anatomy and Physiology, was elected to fill the position vacated by Mr. Moon; and Mr. Leonard Matheson was appointed to the vacant Assistant Dental Surgeonship.

During the year Mr. Lloyd Williams and Mr. Rilot having retired from the House Surgeonship, Mr. R. Wynne Rouw now holds the appointment.

The Committee have pleasure in stating that the room in the Tower basement recently fitted up as a workroom, where the students can make regulating plates, models, &c., &c., has proved most useful, and Mr. W. A. Hooton, one of the students, has been appointed to undertake the charge of the room and superintend the work therein carried out.

The Committee desire to tender their special thanks to Sir Edwin Saunders for his great kindness in respect to the Scholarship which bears his name. Through an unexpected change in the investment connected with that endowment its income was reduced about £3 annually. Sir Edwin generously undertook to

supply the deficiency during his life, and hoped to bequeath a sufficient sum to maintain the Scholarship in the future.

The Medical Committee have heard with pleasure and satisfaction that a scheme is in contemplation for providing additional accommodation in the Hospital, as with the increased number of patients in daily attendance, and an unusually large entry of students, the good work of the Hospital and School is now carried out, in the space at command, under conditions of great difficulty.

After the usual votes of thanks, the meeting terminated.

EDINBURGH DENTAL HOSPITAL.

THE Annual Meeting of this Hospital was held on 25th January, the chair being occupied by Sir WILLIAM MUIR, K.C.S.I.

The Report bore testimony to the continued usefulness of the Institution, as proved by the fact that, in 1881 the total number of patients treated numbered 4,643, while last year the number was 6,737, an increase of 2,094. In 1881 the number of teeth stopped was only 485; last year the number stopped was 1,766. This is a most gratifying advance, and shows that the Institution is exerting a strong educational influence upon the people in the care and preservation of those useful organs, and gives hope that the day is not far distant when the indiscriminate extraction of teeth will be a thing of the past.

The work of the year has been tabulated as follows :—

OCCUPATIONS OF PATIENTS WHO RECEIVED SURGICAL ATTENTION OR ADVICE,
FROM 1ST JANUARY TO 31ST DECEMBER, 1886.

Bakers and Confectioners ...	76	Brought forward ...	2268
Bookbinders	80	Painters	54
Blacksmiths	96	Plumbers and Tinsmiths ...	96
Brassfounders and Coppersmiths .	55	Printers	176
Butchers	22	Policemen	6
Boot and Shoe Makers	71	Servant Girls	490
Clerks	60	Stationers	34
Drapers	14	Salvation Army	2
Dressmakers	102	School Boys and Girls ...	1592
Enginemcn	66	Tailors	120
Factory Boys	144	Tax Collectors	2
Factory Girls	160		
Grocers	32		4840
Joiners	145	Stoppings	1766
Jewellers	14		
Labourers	627		6606
Male Servants	44	Anæsthetics	131
Married Females	460		
			6737
Carry forward ...	2268		

NO. OF STOPPINGS AND MATERIALS USED.

1886.	Gold.	Amal.	Wht.	Tin	G. P.	Total.
January	27	87	37	4	—	155
February	29	144	36	—	—	209
March	44	150	53	—	2	249
April	19	96	12	—	—	127
May... ..	16	102	74	—	1	193
June	44	125	54	—	1	224
July	40	87	27	—	1	155
August	—	12	10	—	—	22
September... ..	4	17	10	—	—	31
October	4	58	23	—	—	85
November	26	99	60	—	1	186
December	25	72	31	—	2	130
Totals	278	1049	427	4	8	1766

NO. OF PATIENTS UNDER ANÆSTHESIA AND THE ANÆSTHETIC USED.

Gas.	Gas and Ether.	Chl.	Ether.	Cocaine.	Total of Patients.
98	16	14	1	2	131

In connection with the Dental Mechanics' Class, 6 Pivot Teeth, 4 Regulation Plates, 6 Dentures, and 2 Obturators were inserted during the year.

Number of Patients attended 6,737

Patients who had Extractions performed.	Children under 14	...	1,592
	Adults ... ..	...	3,248
	Under anæsthetics	...	131
Gold Stoppings	...	...	278
Other Stoppings	...	...	1,488
Miscellaneous ...	...	...	18

Total operations 6,755

The income, including balance (£314 19s. 11d.) from last account, amounted to £614 os. 7½d. The expenses were £211 9s. 3d., leaving a balance in hand of £402 11s. 4½d.

On the motion of the CHAIRMAN, the Reports were unanimously approved of.

A vote of thanks was accorded to Sir Wm. Muir for his presence and conduct in the chair, and the meeting terminated.

NATIONAL DENTAL HOSPITAL.

THE Annual Meeting of the subscribers was held at the Hospital on March 22nd, the President, the Right Hon. the EARL OF STRAFFORD in the chair.

The Committee of Management, in the Twenty-fifth Annual Report, stated that the past year had been one of unusual success. The ordinary current income had, notwithstanding the unsettled times and prevalent bad business, which affect charities so disastrously, kept almost level with preceding years, and it had done so mainly through the very satisfactory channel of the patients' payments, which showed an increase of £64 18s. 4d. over those for the previous year. In addition to this, the hope expressed by the Committee in their last Report—that sufficient help would be received to enable them to provide the additional accommodation urgently asked for so often by the Medical Committee—has been realised. By means of a dinner held at the Albion, on 29th June, 1886, the Committee have a balance in hand sufficient to carry out the long needed additions and alterations.

The receipts for the year, including £52 16s. 10d. balance, were £722 10s. 11d., and £134 5s. 6d. raised at the dinner. The expenses were £669 1s. 11d.

The Medical Committee submitted the following annual statement of operations performed from January 1st to December 31st, 1886:—

Number of Patients attended	...	...	22,122
Extractions : Children under 14	...	...	4,910
Adults ...	...	...	7,616
Under Nitrous Oxide	...	...	6,291
Gold Stoppings	...	...	860
Other Stoppings	...	...	7,195
Advice and Scaling	...	...	3,380
Irregularities of the Teeth	...	...	2,588
Miscellaneous	...	...	1,881
Total	...	...	34,721

These figures show an increase of 1,755 patients, and a decrease of 2,643 cases, over those for 1885.

Mr. Maughan has been appointed Anæsthetist in the place of Mr. Tyrrell, resigned; and Mr. Patinson has been appointed House Surgeon in the place of Mr. Prager, who had for two years very ably and efficiently fulfilled that duties of the post. No other changes have occurred in the staff.

In conclusion, the Committee reported that they had resolved to admit registered female Medical Students to the practice of the Hospital. They believe this to be a step in accordance with the advanced opinion of the times and one which will show how desirous they are of extending in every way the usefulness of the National Dental Hospital.

The Reports were accepted.

VICTORIA DENTAL HOSPITAL.

THE Annual General Meeting of Governors of this Institution was held on the 28th February, in the Town Hall, Manchester, his Worship the MAYOR OF MANCHESTER in the chair.

In presenting the third Annual Report, the Committee of Management had great pleasure in being able to announce the continued prosperity of the Institution, and to express their satisfaction in the increased appreciation of its advantages by those for whose benefit it had been established. The increase in the number of patients treated in 1886 was nearly 2,000 as compared with 1885.

In furtherance of the educational and charitable work, the Committee have been fortunate in securing the services of a House Dental Surgeon. The increased expenditure thus entailed, added to that naturally caused by the rapid advance in the charitable work of the Hospital, renders it necessary for the Committee to make an appeal to the public to help them in their charitable efforts.

The receipts for the year were £205 2s. 1d., and the expenses £196 11s. 11d. There is a balance at Bankers of £65 5s. 2d.

The report of the Dental Committee gave the summary of cases treated from January 1st to December 31st, 1886, as follows:—

Children	...	...	...	...	...	4,994
Adults	...	...	...	...	...	5,633
Total patients						<u>10,627</u>
Extractions	...	...	...	...	...	7,958
" under Anæsthetics	...	...	...	...	...	391
Gold Fillings	...	...	...	...	...	344
Other Fillings	...	...	...	...	...	965
Miscellaneous and Advice Cases, including						
Treatment of Irregularities	...	...	...	...	...	<u>3,564</u>
Total						<u>13,222</u>

The average attendance had been a little over 15 in the mornings and 40 in the evenings, the much larger evening attendance being in a great measure due to the fact of the Hospital being open only three evenings in the week.

The reports were adopted.

ODONTOLOGICAL SOCIETY.

THE Ordinary Monthly Meeting was held on March 7th, Mr. FELIX WEISS, Librarian, in the Chair.

MR. AUGUSTUS WINTERBOTTOM exhibited his electric apparatus for driving the dental engine, &c. The electrical current was generated by a zinc and carbon battery of eight pairs of cells, which would run a double set of apparatus and require no re-charging for from fourteen to twenty-one days, according to the amount of work done. Two solutions were used, nitrate of soda and dilute sulphuric acid, and it could be easily emptied and re-filled in about half-an-hour by means of compound syphons. He had had the battery in use for about four months, and had not yet found it fail, even in foggy weather, when it was supplying both light and motor all day. He found that the entire cost of wear and tear, including fluids and new plates, amounted to six-pence a day, or about half-a-crown a week.

The strength of the current was readily controlled by means of a "switch board," by which it was made to pass through a series of resistance coils, and the amount of energy regulated to suit the needs of each instrument.

It could be made to drive the dental engine through the instrumentality of an ordinary electric motor. This was slung to a rod or beam overhead in such a manner that its position could be easily altered, and it was quite out of the way.

The speed could be varied from 1,500 to 4,000 revolutions per minute, and owing to the rapidity and steadiness of its action, a tooth could be cut away much more quickly, and with much less pain to the patient than when the ordinary pedal action was used; it cut also with but little pressure, without any fatigue to the operator, and his body being perfectly steady, the instrument could be directed with the greatest nicety, and without any risk of accidental slips. This ease and painlessness were especially noticeable in cutting down roots, or where a considerable portion of a

sound tooth had to be cut away; in such cases the saving of time was very considerable. So also in cutting down gold fillings, easing bites, inserting Herbst's fillings, &c. With proper adjustment the current could be made to work the Bonwill mallet, and, lastly, it was extremely useful for illuminating purposes.

Mr. GEO. BRUNTON said he had made trial of the electric light for dental operations, and could not speak as favourably of it as Mr. Winterbottom had done. One great objection to it was the strong shadow it threw. He would suggest to Mr. Winterbottom that a reflector coated with plaster of Paris would be found to give a much pleasanter light than an ordinary metallic reflector.

With reference to the engine motor, he thought, judging from his own experience, that the *lowest* speed mentioned (1,500 revolutions per minute) was too fast.

Mr. E. LATCHMORE said he had been using a similiar arrangement to that exhibited by Mr. Winterbottom for about four months, and he readily endorsed all that that gentleman had said in its favour. As to the speed, he did not find the highest rate (4,000 revolutions per minute too much. It did its work with great rapidity, and almost painlessly, its advantages being specially noticeable in such an operation as cutting away part of the crown of a molar to get at a posterior root. He had recently had a difficult extraction in which he found it most useful. Finding it quite impossible to remove a lower canine by the ordinary methods, he gave ether, extracted the first bicuspid, rapidly cut away the septum between it and the canine, and levered out the latter tooth from behind. He could not have done this with the ordinary pedal engine, except with a considerable amount of difficulty.

The following paper was read:—

ON THE PHYSIOLOGICAL ACTION OF NITROUS OXIDE GAS.

By DUDLEY WILMOT BUXTON, M.D. and B.S.Lond., M.R.C.P.

Administrator of Anæsthetics in University College Hospital, the Hospital for Women, Soho Square, and the Dental Hospital of London.

IN a preliminary communication made before this Society, I attempted to review some of the more authoritative views which have from time to time been advanced with regard to the physiological action of nitrous oxide upon the organism. It remains for me to consider the evidence which experimental research has placed in our hands, and to attempt as briefly as may be to

formulate what conclusions are warranted by the results of such researches; and further, to adduce from these conclusions practical rules such as may guide us in the employment of nitrous oxide gas as an anæsthetising agent.

Aeriform bodies can only obtain ingress into the vital system of warm-blooded animals by absorption and diffusion through mucous membranes; practically this absorption is in the higher mammalia confined to the vast expansion of surface afforded by the acini of the lungs. Passing through the sinuous nasal meatuses, aeriform bodies are warmed, and sifted, so to speak, of floating solid particles; they then traverse the guardian portals formed by the larynx, and so enter the lungs. Usually the constrictors of the pharynx maintain a closure of the œsophagus; however, timid persons, whilst inhaling nitrous oxide, make efforts at swallowing which, by partly inflating the stomach, may give rise to unpleasant effects, nausea or mechanical interference with the action of the heart, and so leading to syncope. This should, of course, be avoided.

So thin is the wall of the acini and air-cells, that the lungs may be considered as consisting of aeriform matter, separated from liquid matter by an exceedingly tenuous animal membrane, which is capable of the active interchange of gases from the aeriform matter to the liquid matter, and *vice versâ*. Whatever aeriform body is inhaled into the lungs, provided it does not impede the mechanical acts of respiration, can diffuse into the blood, while the gases in the blood can diffuse out into the free air space of the lungs. Gaseous bodies we know exist in at least two conditions in the blood—(1) in mere solution, (2) in combination with the albuminoids found in the corpuscles and serum. The essential conditions of life for the organism are that in proportion as the bodily tissues are split up for the production of movement, or force, heat, electricity, and so on, so should the blood obtain organic material from the alimentary tract, and oxygen wherewith to build it into the tissues; and secondly, that the blood shall be also depurated of organic and saline refuse, and of aeriform impurities through mechanism supplied by the lungs. This, I need hardly remind you, consists in the diffusion of carbonic acid gas and other obnoxious materials from the blood into the residual air in the air space, and the diffusion into the blood of oxygen from the residual air. So long as the oxygen

tension is higher and the carbonic acid tension is lower in the residual air, so long will interchange between blood gases and atmospheric gases take place. When, however, other aeriform bodies than atmospheric air find their way into the air space of the lungs, other conditions are imposed upon the organism. Let us consider these. If the gas be respirable, and actually enters the lung space, it will obey the laws of diffusion, and in course of time displace the residual air. Then, being brought into close contact with the blood, it will either simply allow of diffusion out of blood gases, and, provided its tension in the lungs is above that in the blood, diffuse into the circulation and so reach the tissues, there to be rejected or built into their substance according as it is available or not for their metabolism; and if it is able to link itself into chemical union with some constituents of the blood it will travel so combined to the tissues, and more or less profoundly influence their behaviour according to its own vital peculiarities.

Let us consider to what class nitrous oxide gas belongs, and what is the *rôle* it plays in the blood. Priestley found nitrous oxide was readily absorbed by water, in a proportion of one-half its bulk. When carbonic dioxide is present in the water no absorption of nitrous oxide takes place; but according to the careful experiments of Davy, when water saturated with nitrous oxide is brought into contact with carbonate dioxide, the latter ousts the nitrous oxide, becoming absorbed while the nitrous oxide is liberated. According to the same authority, nitrous oxide will displace oxygen and air from water. When we remember that blood consists of 78 per cent. of water, we see these researches have a very important bearing. Neutral saline solutions, further, possess very feeble attraction for nitrous oxide. None of the older observers investigated the behaviour of nitrous oxide toward water in which albuminous material was present, and my investigations in this direction are not, I think, sufficiently definite for me to venture upon *ex cathedrâ* utterances; but it seems probable that albuminous solutions of various strengths are possessed of powers of absorbing nitrous oxide other than those inherent in pure water.

The presence of nitrous oxide in the air space of the lungs is of importance in the following relations:—(1) By methods in use in this country oxygen is practically excluded, and, were oxygen

admitted together with nitrous oxide, it is probable, our present knowledge tells us, that the oxygen would not be ousted by the nitrogen compound; and (2) the effect nitrous oxide has upon the elimination of carbonic dioxide from the lungs.

1. The deprivation of oxygen leads to asphyxia pure and simple; for example, if a person inhales in an atmosphere of nitrogen, although all carbonic acid (dioxide) diffuses out, yet asphyxial symptoms, hyperpnœa, dyspnœa, and convulsions appear.

2. Now does nitrous oxide in any way interfere with the elimination of carbonic acid (dioxide) from the lungs? Careful experiments have shown that nitrous oxide affects carbonic acid elimination in only an indirect way. During the cutting off of oxygen supplies, the tissue metabolism, whereby carbonic acid and water are thrown into the circulation, is greatly lessened, and as a consequence the production of carbonic acid is decreased, so that in this case the diminished elimination is merely an indication of lessened production. We find a marked similarity between the tissues rendered stagnant by nitrous oxide, and the sluggish behaviour of organic matter in animals during hibernation. At the same time there is a fairly active carbonic acid elimination, as much in fact as represents the tissue waste during the period of anæsthesia; and this carbonic acid, in the absence of recuperative oxygenation, is, I submit, an important matter requiring our attention when we have to take into consideration the practical lessons the physiology of nitrous oxide narcosis teaches. Here I will briefly say it seems consonant with these lessons that we should ensure the removal of this carbonic acid so that the patient may not breathe and re-breathe nitrous oxide polluted by it.

We may then take it that the blood is capable of acquiring nitrous oxide by simple absorption, and probably by the union of that gas with the albuminous materials found in the liquor sanguinis and corpuscles. No attempt has as yet succeeded in demonstrating the conjunction of nitrous oxide with hæmoglobin—at least no crystallised forms have been found, such for example as we are cognisant with in the case of nitric-oxide hæmoglobin. However, in the last case we have to bear in mind the fact which was pointed out long ago by Davy, that nitric-oxide possessed a strong affinity for the salts of iron, so that it is perhaps not unwarrantable to suppose the iron-containing hæmoglobin should

readily unite itself in actual chemical union with nitric-oxide. But nitrous oxide can, as we have pointed out above, actually oust oxygen from its condition of absorption, and must with great rapidity become intimately associated with some of the blood constituents in order that it may be wafted, with the extraordinary rapidity we all are aware of, to the nervous centres, there to bring about that profound change in the nerve tissue which is evidenced externally by the anæsthetic como of nitrous oxide narcosis. Researches made by means of the spectroscope upon blood when it is impregnated with nitrous oxide, do not, at least to my mind, afford us evidence of value. MacMunn, whom I have before quoted, failed to obtain any characteristic spectrum from the blood of animals poisoned with nitrous oxide. I have repeatedly made the attempt to obtain a spectrum peculiar to this agent, but have also met with want of success, the only bands discernible being the broad one between Fraunhofer's D and E lines, which of course merely represents the spectrum of reduced hæmoglobulin. My friend Dr. Halliburton, Assistant Professor of Physiology in University College, was good enough to examine some blood for me, and he concurs in the results given above. Now this negative evidence cannot, I submit, be taken as sufficient for us to base conclusions upon it which deserve to be reckoned final. The present methods at my disposal preclude me from ascertaining the condition of the blood when nitrous oxide in quantity sufficient to induce anæsthesia is given along with oxygen. I hope to be able to conduct this research later on; but as it necessitates a Fontaine's chamber I can only prosecute it in Paris. Under the present circumstances, *pari passu* with the introduction of nitrous oxide, we have the reduction of the hæmoglobulin by the tissues, hence the spectrum of reduced hæmoglobulin which is found.

In all experiments upon Mammalia with nitrous oxide gas, methods have been adopted which not only ensure a supply of the gas entering the lungs, but, at the same time, cut off the ingress of oxygen, so that there must in these cases always be a danger of confounding the symptoms due on the one hand to nitrous oxide, with those upon the other which arise solely from the deprivation of oxygen. And further, in some experiments which we shall shortly have to consider, a third set of symptoms intrude themselves, namely, those dependent upon re-breathing noxious

exhalations from the lungs. It is incumbent then upon us to make allowance for these sources of confusion.

It has been my endeavour in my own researches to eliminate as far as possible those conditions giving rise to serious fallacies in deducing conclusions, by conducting control experiments in which asphyxial phenomena were brought about. Further, by the use of an expiration valve in my tracheal cannulæ, I have attempted to obviate accumulation in the lungs of mephitic material. I am quite sure that much of the erroneous teaching, which even now is rampant, and which regards nitrous oxide narcosis as merely asphyxia, arises from neglect of the above precautions.

Among experimental researches I think we must place Sir Humphry Davy's first, not only in priority, but in excellence; for considering the limited means at his disposal, and the imperfect knowledge of physiology which existed in his day, we must admit his research was worthy of so great a philosopher.

In one series of experiments Davy placed cats, dogs, guinea-pigs, rabbits, mice, and birds under bell-jars filled with nitrous oxide by displacement over water, and allowed them to respire the gas. In some cases he noted much excitement, followed by loss of sensation, and final death through cessation of respiration. He removed certain of his animals from beneath the bell-jar, and placing them before a fire watched their recovery. Curiously enough, he observed that in many instances the animals were more or less paralysed, some being hemiplegic and some paraplegic—at least such appears from his statements to have been their condition.

In his second research Davy compared the behaviour of animals immersed in nitrous oxide with those placed in hydrogen and others kept below water. Reasoning from these experiments he says, "there was every reason to suppose that their (the animals') death in nitrous oxide should not depend upon the simple privation of atmospheric air; but that it was owing to some peculiar changes effected in the blood by the gas."*

But these experiments, like those of many subsequent observers, are open to the criticism that the method employed confounded asphyxial with nitrous oxide effects.

* Collected Works, vol. iii., p. 204.

Krishaber's researches, made chiefly with rabbits, may be considered under two categories : those in which nitrous oxide with small undetermined quantities of air was employed, and secondly, when the animal being tracheotomised, nitrous oxide only was breathed. His conclusions are that nitrous oxide narcosis differs wholly from the asphyxial state, for, as he justly points out, no true anesthesia is brought about in asphyxia, whereas entire loss of sensation and voluntary movement come about in a minute when nitrous oxide is employed. With Krishaber's subsequent attempt to institute a comparison between nitrous oxide narcosis and the anæsthetic sleep of chloroform, we have nothing to do.

Amory of New York has done some very valuable work upon the physiology of nitrous oxide ; he investigated the gas expired during the inhalation of nitrous oxide, and further repeated Davy's experiments by placing pigeons under bell-jars filled with nitrous oxide by forcing in that gas above and letting out the atmospheric air below. Dr. Amory's researches, both those quoted and those which I have for the present passed by, are altogether admirable, and throw much light on the difficult question under review.

It appeared evident to me that nitrous oxide gas exerted a very considerable effect upon the nervous system, and I was anxious to undertake experiment in the direction of the ascertainment whether or not it produced physical changes in the condition of the brain. One way in which it was possible to investigate this point was to examine the actual changes, if any, in the brain whilst the animal was placed under nitrous oxide.

Accordingly the experiments were made, by the kindness of Professor Victor Horsley, at the Brown Institution.

The skull of a medium-sized dog was trephined, and nitrous-oxide gas given through a tracheal tube fitted with a very freely acting expiration valve. The trephine hole exposed the outer third of the sigmoid gyrus on the right side. Under normal conditions the brain was seen some measurable distance beneath the bone pulsating quietly and synchronously with the respiration. The colour of the brain covered with pia mater was pinky red, or, more exactly, vermilion.

As soon as the animal began to breathe nitrous oxide, the respiratory rhythm being interfered with, the brain pulsations became more notable and somewhat hurried. When the gas was

pushed, and the animal made to take it in freely, the brain substance was seen to swell up and gradually reach the trephine hole. The colour now began to change, and a dark, blue-red shade appeared to creep over the exposed brain, robbing the brightness of the vermilion and replacing it by a laky purple. The brain undulations were at this stage found to lessen in frequency and amplitude. The brain substance still increased in volume, and even protruded without the trephine hole, almost motionless, and of a pearly, glistening lustre of bluish hue. The vessels, examined with a strong lens, presented the well-known look of commencing stasis. At this stage the nitrous oxide was stopped, and the animal allowed to inspire air freely. Quietly and gradually with each successive breath of air the brain receded, the undulations returning and resuming their normal rythm and range. With these changes came a return of the vermilion tinge which characterizes the healthy brain substance. This experience was repeated. In some cases the animal was anæsthetised by means of a face piece with an expiration valve, and in others a tracheal tube was introduced, but the phenomena observed were strikingly uniform. It was next determined to conduct a control experiment, first pushing the nitrous oxide to the verge of death, and subsequently producing asphyxia by deprivation of all air.

In the experiment in which nitrous oxide was given, the brain being exposed as in the last research, the gas was pushed until respiratory movements completely ceased. In a little over a minute (1 min. 10 secs.) the brain substance had become livid and swollen to above the calvarial edge; the animal was absolutely insensitive to painful sensation; his limbs showed marked jactitations. In about 1 min. 30 secs. normal respiratory movements had ceased. Artificial respiration was promptly had resort to, and speedily the natural thoracic movements were resumed. The trachea was then occluded and the brain observed. In about a minute the brain substance assumed a deep purple dull hue, which in another half minute became very intense; the brain then began to recede, sinking deeply from the trephine hole. In two minutes the sphincters became relaxed, and further sinking of the brain took place. In three minutes the respiration movements were very profoundly interfered with, only manifesting themselves by long-drawn gasps, which were separated by long

intervals. In five minutes, although all respiratory movements had ceased, the heart still beat. In six minutes access of air was allowed, but artificial respiration failed to effect recovery.

These experiments appear peculiarly instructive, firstly, as showing in a very marked way the difference between the brain condition when fed with nitrous oxide-laden blood, and when supplied with deoxidised blood containing tissue refuse; and secondly, when viewed in relation with the clinical phenomena of nitrous oxide narcosis. As I pointed out in my last communication to this Society, there is a zone of hyperæsthesia which separates the normal consciousness from the absolute loss of sensation on the one hand, and on the other which unites the stage of oblivion, or sleep, with the return to full mental activity. It is presumably at this epoch when the dreams of mental exaltation and physical joy occur, and it is then that slight external physical stimuli—*e.g.*, a flash of light, a noise, a movement—will become a thousand-fold magnified and perverted in the patient's brain. The peculiar filling of the brain would seem to offer a physical counterpart for these mental conditions, and apparently rapidly so modifies the brain cells that they are incapable of further reception or ideation: an initial increased exhalation gives way to a complete abeyance of function.

Experiments in the same lines were also made with regard to the action of nitrous oxide upon the spinal cord. The animal being under the influence of chloroform and curare, the laminæ of the lower dorsal and lumbar vertebræ were removed and the cord exposed lying in the spinal canal. The animal was then made to respire nitrous oxide, only expiring through a slit in the cannula. A very marked effect soon showed itself: the cord gradually enlarged and cerebro-spinal fluid began to well out, showing the enlargement of the whole length of the cord. This experiment was repeated, and the same result was always obtained. However, as will readily occur to you, two causes might have conceivably produced this effect, namely—(1) the exclusion of oxygen, *i.e.*, the asphyxia, or (2) the presence of nitrous oxide. To test which of these possible factors was really responsible for the swelling up of the cord, the animal was deprived of air, and no nitrous oxide given. At first the cord remained unchanged—at least no swelling took place, and no escape of cerebro-spinal fluid occurred. Soon, however, as the blood became

more and more deoxygenised, the cord grew smaller, shrinking below its former level in the spinal canal. There was no doubt but that while in nitrous oxide administration the cord, like the brain, "grew larger, in asphyxia it shrank. To test this effect further, the following crucial experiment was tried. The animal was subjected to asphyxia, and the cord was watched until it had perceptibly shrunk, when nitrous oxide was allowed to enter the lungs. If, as we assumed, nitrous oxide was capable of dilating the vessels of the cord when acting upon them in a normal condition, it was thought that it should produce a like effect when the cord vessels were contracted by asphyxia. The experiment confirmed this supposition, for as soon as the animal had its lungs well saturated with nitrous oxide, the cord was seen to expand and the cerebro-spinal fluid began to escape.

We may now briefly consider the conclusions these experiments upon the brain and spinal cord appear to justify. In brain and cord alike, we meet with dilatation of the vessels, with of course, an increased blood supply to the nerve-centres. Such a condition would indicate a condition favourable to the dissociation of nervous energy, but this would soon be followed by a condition of over-distension and interference with due regularity of the cerebral and cerebellar circulation subversive of ideation and the performance of adjusted muscular action. The interference to the cord circulation must also interfere with the due conduction along its paths as well as with the correlation between its parts and the higher brain centres. At present we may not be in a position to theorise beyond the broad general statements given above, but I think we may justly recognise in the interference with the circulation of the brain and spinal cord, produced by the inhalation of nitrous oxide, a phenomenon which accounts for not only the every day experience we meet with in giving the gas to human beings, but also to those aberrant cases which occur more rarely, and evince marked nervous exhaustion, irregular outbursts of nervous energy. But of these states I will speak again later on.

The development of nervous symptoms certainly varies largely with the initial state of the nerve protoplasm, for while in some persons nitrous oxide induces marked nerve disturbance, in others it brings about none whatever. I may here be allowed to introduce a brief note upon ankle clonus as revealed under nitrous

oxide. This phenomenon is in a certain percentage of cases produced when the patient is deeply under the gas.

Among reflexes it is usual to consider two classes, skin or superficial reflexes, of which a familiar example is found in the conjunctival reflex, and deep, of which we have examples in ankle clonus and the patellar jerk and front tap reaction. In health, and under normal functional conditions, the superficial and the patellar reflex are present; certain pathological conditions lessen or exaggerate these reflexes, and cause the development of ankle clonus. I think, however, we may take it that the presence of ankle clonus points always to disease or functional derangement of the spinal cord. Now nitrous oxide produces very marked derangement of the reflexes. In October, 1883, Professor Horsley* drew attention to the persistence of the patellar phenomena under profound anæsthesia, and long after the disappearance of the superficial reflexes. Clonus, I have found to be developed in a number of cases, although it is not a constant phenomenon of nitrous oxide narcosis; hence this gas not only abrogates the function of the brain centres, but also produces marked disturbance in the cord while it blunts or obliterates peripheral sense. What is the exact nature of this derangement of the cord functions we cannot, I think, venture at present to offer an opinion; we can only study it by means of the phenomena it reveals. These also are various, differing, it would appear, according to the stability of the nervous centres of the individual subjected to observation. Nor is this surprising when we remember that the effects are very transitory, and must be largely influenced by collateral circumstances. The more constant cord phenomena are—rigidity of the muscles, which passes into complete flaccidity; jactitations which appear rhythmic and general; loss of superficial reflexes; persistence of knee jerk. Among the occasional phenomena we may reckon—ankle clonus; opisthotonus and emprosthotonus; paralysis of the bladder and defæcation centres, and involuntary and unconscious passage of urine and fæces; probably excitation of the sexual centres, and abolition of the normal checks imposed upon unconscious orgasm. Further, we must reckon the secondary results apparently due to a more lasting cord effect, as seen in paresis or even paraplegia

* "Brain," vol. vi., p. 369, *et seq.*

following nitrous oxide inhalation. Many of these phenomena are confessedly rare, and are perhaps only elicited in nervous systems predisposed to take on the condition, whatever it may be, which nitrous oxide induces. In some respects nitrous oxide would appear to hold comparison with strychnine. The rigidity, with the occasional liberation of irregular and disorderly explosion of nerve energy, occur, although with different degrees of persistence, alike with one and the other drug. This would perhaps give a clue, and suggest that under nitrous oxide the higher ideomotor centres lose control, the resistances throughout the cord are lessened, and the cells, deprived of the normal restraints imposed by habitual and associated action, tend to irregular explosive outbursts. It seems at least probable that under nitrous oxide not only do we meet with a stage of preliminary exaltation of function, misdirected indeed, and unconstrained by judgment, in the brain centres exemplified by the stage of hyperæsthesia spoken of above, but that in the lower cord centres we recognise a similar initial heightening of activity, also irregular and disorderly, followed by cessation of their functionation. Indeed, I venture to think the same sequence of events happens in the vital centres, and that this explains much of what follows in the remarks made upon blood pressure, cardiac, and respiratory rhythm. But although we may not as yet go far enough to dogmatise upon what is the nature of this action upon the cerebro-spinal axis, yet it seems consonant with our facts to regard it as a sedative, which, while provoking an initial exaltation of function, eventually plunges the tissues into a sleep, or state like the long dose of hibernation. Certain it is in some cases one meets with a quiet prolongation of nitrous oxide narcosis, unaccompanied by the wild convulsions of asphyxia, when the breathing absolutely stops while the heart beats on. In this state presumably the cord centres have gradually yielded, and, the medulla reached, the respiratory centre has also peacefully ceased from work, and the patient is entranced alike in his mental and vegetative functions. In these cases artificial respiration, conducted for one or two admissions of air, restores the patient to animation, and all goes well. No danger is, in fact, incurred unless the anæsthetist is either incompetent or negligent of his solemn charge. It seems hardly worth while to do more than to beg you to compare mentally these phenomena with those afforded when asphyxia terminates

life. To contrast what has just been described with the mental activity persisting almost to the last gasp, the purposeful struggles, the wild chaotic respiratory efforts, the frantic writhings of the voluntary muscles, and at length the general massive convulsions passing into a false quiet marked by an occasional gathering together of the failing nervous energy to effect a spasmodic explosion of muscular force. "Look upon this picture, and on this!"

Knowing that one of the greatest and gravest dangers which beset the induction of anæsthesia is heart failure, it becomes matter of very great importance for us to determine the behaviour of nitrous oxide towards the heart and vascular system in general. My investigations in this direction have been made to ascertain the action of the heart and the variations of blood pressure under nitrous oxide; and further, to determine how far the variations seen when nitrous oxide was exhibited were due to that body, and how far to the coincident deprivation of oxygen.

The animals selected were dogs and cats, but as the results were practically uniform it is unnecessary to particularise the experiments. I must again admit my great indebtedness to my friends Professor Victor Horsley, Mr. Bradford and Professor Schafer, through whose kindness alone the research only was practicable.

The heart's action does not become much affected under nitrous oxide, and even in cases in which that gas is pushed until complete cessation of respiratory movements occurs, the heart still continues to beat, its action gradually growing weaker. In no case have I seen any tumultuous action of the heart or a sudden cessation, only the gradual sinking to rest noticed above. The attempt at narcotising animals and timid persons produces a temporary acceleration of heart-beat, but as soon as the intellect becomes under the influence of the narcotic this acceleration passes off and the heart-beats become regular and strong and somewhat slowed. It will be remembered that these results are in accord with the statements already published by me, and based upon numerous sphygmographic tracings taken of the human radial pulse.

The blood pressure under nitrous oxide inhalation has the following peculiarities. For the first period it shows little change; but subsequently a fall of pressure takes place. Upon allowing

the animal to en hale air, the blood pressure recovers itself, but only gradually and by passing through a phase or somewhat irregular curves. These curves are not respiratory, as they take place even when the animal is completely paralysed with curare, and artificial respiration is maintained. In some cases a slight, but very slight, rise in the blood pressure took place, but a rise of blood pressure appears always to follow the nitrous oxide inhalation. Control experiments were conducted to test the effect upon blood pressure when the animal is deprived of air. These were done upon curarised animals in order to avoid the interference caused by dyspnœic convulsions. As soon as the air supply was cut off, the blood pressure began to go up, and rapidly increased until the heart's action, which lessened in force, *pari passu* with the heightened blood pressure, became so weak that it was necessary to allow air to enter the lungs. The blood pressure then resumed its normal height very quickly; but the rise which follows after nitrous oxide administration does not appear to ensue after asphyxia.

It seems to me upon reviewing the nitrous oxide experiments, and controlling them by the asphyxia experiments, that nitrous oxide itself has no very marked influence upon the heart or vessels; that what action it has is to steady and slow the heart, and if anything to strengthen it, and that the action is somewhat prolonged. The vessels at first almost unaffected, later on undergo a peripheral dilatation, leading to a lowering of blood pressure. This, however, is true only when reservation is made; for as we shall see later on, the splanic vascular areas are contracted at first. Upon this last statement I have some additional evidence to offer. A good-sized frog (*Rana temporaria*) was placed beneath a dome-shaped glass vessel, so arranged that the web of one foot was outside the vessel and could be examined under the microscope. The dome was emptied of air and kept full of nitrous oxide, and the frog carefully noted while the web was examined. It was necessary to keep the whole animal in nitrous oxide, as cutaneous respiration is very active in the frog. At first the circulation in the web was found to be slowed; at the same time the minute vessels were seen to dilate, and both this slowing and dilatation became more marked as time went on. Changes also appeared to develop in the corpuscles by which they took on a flattened compressed appearance. At length the respirations,

which had become slower and slower, became almost extinguished, the capillary circulation in some areas was almost in a condition of stasis, whilst throughout the field extreme slowing had occurred. At this point the frog was allowed free access to air, and at once the respiration quickened, the blood flow increased in rapidity, becoming many times more rapid than under the gas. The corpuscles resumed this normal aspect. The results of such experiments upon the frog point to a peripheral dilation of capillaries, and of this further evidence has yet to be adduced. It needs no argument to show that a vascular viscus, like either the kidney or the spleen, must under variations of blood supply undergo variations in size. If, therefore, it were possible to inclose either viscus in an air-tight receiver communicating with an oil manometer, it would give indications of increase or diminution of size according as the blood supply were increased or lessened. Mr. Bradford has kindly enabled me to investigate this point pretty fully.

The experiments made upon the kidney were tolerably numerous, and were singularly uniform in their results. The kidney in an animal narcotised with nitrous oxide speedily undergoes contraction, which corresponds, of course, with the contraction of the kidney arteries. This contraction continues as long as the nitrous oxide is given, but as soon as that is cut off and the animal respire air the kidney speedily recovers its normal size, but no dilatation of vessels beyond normal takes place. With this condition we have to compare the behaviour of the kidney in an animal subjected to asphyxia. Here the kidney undergoes a dilatation as soon as air is cut off. This corresponds with dilatation of the renal arteries, and is probably due to increased heart action called into being by the venosity of the blood. Later on, when the heart fails, the kidney suddenly contracts, a very rapid fall in the kidney curve occurring. Thus a singular but striking contrast in the behaviour of the kidney reveals itself according as that viscus is influenced by nitrous oxide or asphyxia. This effect upon the renal circulation must not be taken as militating against the statements made above with regard to the general blood pressure as shown by the carotid artery and about the circulation in the brain and cord. It is well known that certain sedatives—morphine, for example—dilates the vessels in one area while they contract those of other areas.

Passing to the effects produced by nitrous oxide upon respiratory rhythm, I will detain you only a few moments.

The chest movement will, as is well known, continue without any air entering if a sufficiently long and small elastic tube be attached to the tracheal cannula, so that one can easily compare asphyxia with nitrous oxide narcosis. In the last condition the respirations are at first quickened, but not lessened in depth; later on they grow slower and deeper, and still later they become very slow and somewhat more shallow; finally they cease. The time in which this cessation comes about varies considerably in animals. I have not seen the dyspnoëic struggles under nitrous oxide which asphyxia brings about. In human beings I have seen, especially in children, complete cessation of respiration without the slightest preliminary struggle. Alike in the lower animals and man the breathing recommences if pressure is made on the chest. These changes in respiration are, I am inclined to think, due wholly to the action of nitrous oxide upon the nerve centres presiding over respiration.

In conclusion, there are various practical considerations which I think may well be taken into review while studying the physiology of nitrous oxide narcosis.

If, as I submit, nitrous oxide acts as a sedative in virtue of its own inherent properties, and does not owe its value as an anæsthetic to asphyxial processes called into play by concurrent privation of oxygen, it should be our aim to push the gas and give free vent to expired gas. We should see that our patient changes as freely as possible his residual air during inspiration, and expires as freely as possible the refuse-laden nitrous oxide which has been stationed within the air-spaces during the last respiration. I cannot but think that, whatever may be the saving of gas brought about by employing supplemental bags wherein the nitrous oxide is collected and re-inspired again and again, the patient suffers from the double evil of breathing diluted and impure nitrous oxide, and further, is not favourably placed for exhaling the refuse of the lungs. I should incline to attribute to this method the cases one occasionally meets with when persons narrate of severe headache, vertigo, dizziness, and other untoward symptoms as consecutive upon nitrous oxide inhalation. It is, I believe, a very important point to induce very free inspirations of *pure* nitrous oxide, and to avoid anything like inducing partial asphyxia, and I

think in practice this gives the best and the most satisfactory results.

The behaviour of the heart under nitrous oxide should, I take it, encourage us to use nitrous oxide freely, and to watch rather the respiration than the pulse; since it would appear that syncope, if it occurs, occurs secondarily through the lulling to sleep of the respiratory centres. The cases in which nitrous oxide has been said to kill by heart failure are few, and even in these we are not at all sure that the fatal faint was not due to fear or shock incurred by a nervous system already shaken by suffering, and rendered more obnoxious to shock by an imperfect narcosis. When we remember the period of heightened sensibility which precedes complete restitution of consciousness we can easily comprehend the terrible jars a debilitated nervous system must sustain if operative procedure be carried on into this stage. Clover long ago pointed out from his vast clinical experience that patients may be allowed to cease breathing, and yet no fear need be entertained, as a few vigorous pressures upon the thoracic parietes will re-initiate respirations. Now we accept his statement, and explain it under physiological laws.

There are other practical points that are suggested by knowledge of the action of nitrous oxide. Of these not the least important is that the erotism called into existence in a fairly large proportion of patients, and controlled only in a few by the restraints of habitual thought and judgment, should render all persons most careful to avoid possible incrimination through hallucination. For the sake alike of patient and operator a witness should always be within earshot or within sight whenever nitrous oxide is administered.

Again, the decided action this anæsthetic has upon the nerve centres, and its tendency to call forth irregular explosions of nervous energy might by some be taken as contra-indicatory to its employment for patients who are the subjects of epileptiform seizures. I do not, however, think we can with justice say that the giving the gas renders a fit more likely to occur than the operation. We are aware any strong excitant will call forth a seizure, whereas the sedative action of the nitrous oxide will by lessening stimulation from without, be less inclined to provoke the attack.

There is one further remark I would make, and that is con-

cerning the late M. Paul Bert's method of giving nitrous oxide under pressure. I may say that my reason for giving only a passing notice to what must appear to many of you, as a method, in the last degree important. Fully admitting the immense value in theory of Bert's method, I am bound to confess to myself that it at present needs far too much machinery and elaboration for practical work-a-day men like ourselves. Indeed this view appears to be held even in Paris, where a Fontaine's chamber is accessible, for I hear from a correspondent that no cases of operation have of late been conducted by this method.

In conclusion, I have to thank this Society for its courtesy towards myself. The Odontological Society has done more than any other body to elucidate the action of nitrous oxide, and hence it was but fitting that my research should see the light in that Society, and this has been permitted me through the courtesy of two generations of secretaries.

DISCUSSION.

The CHAIRMAN said they were greatly indebted to Dr. Buxton for the amount of original research which he had brought to bear upon a very interesting and important subject. He was sorry to see that so short a time remained for discussion, and he would therefore ask intending speakers to condense their remarks as much as possible.

Mr. WOODHOUSE BRAINE said the question, "In what way does nitrous oxide produce insensibility?" though often asked, had not as yet been satisfactorily settled. He was inclined to believe that nitrous oxide anæsthesia was produced by increased brain pressure. When the filaments of special nerves were made to vibrate in any way whatever, if the rate of vibration set up was the same as that which produced a special sensation, the cerebrum received the impression of that sensation, whatever it might be. Thus a blow on the eye produced the sensation of a flash of light, and when the nerve filaments of the tongue were thrown into a state of vibration by a galvanic current the sense of taste was produced. But if this motion was checked in any part of its course the sensation it usually produced was not perceived. Thus, if a part was frozen by ice or ether spray the nerves were rendered rigid and incapable of transmitting vibrations, and no sensation was felt when the part was operated on, a fact which was taken advantage of in the present day to lessen the pain of an operation, whilst in the olden days of surgery we read that the

pain of an amputation was lessened by making pressure on the nerve trunks which supplied the part to be operated on.

The same result followed when the pressure was not applied to a nerve, but directly to the brain itself. Thus in the case of a slight attack of apoplexy a blood vessel gives way and makes pressure on the cerebral tissue in its immediate vicinity, and paralysis and loss of sensation occur in those parts of the body to which the nerves of that particular part of the body proceed. Again, a blow over the anterior inferior angle of the parietal bone might cause laceration of the middle meningeal artery, and if the blood was slowly poured out, insensibility did not supervene for some hours, or until there was made sufficient pressure on the brain. But when sufficient pressure was made on the cerebral matter the patient became completely insensible, and remained so until the blood was absorbed, or until the surgeon relieved the pressure by trephining.

He wished to call special attention to the part of Dr. Buxton's paper which, he thought, gave the clue to the reason why insensibility followed the administration of nitrous oxide. In the case of the dog which had been trephined and then had nitrous oxide administered, the brain substance was seen to swell until the pressure from within was so great that it absolutely protruded from the brain case through the hole made by the trephine. He thought it was only fair to infer that a corresponding enlargement of the brain substance took place in the case of the human patient when put under the influence of nitrous oxide, the cerebral tissue swelling until the pressure against the cranial walls was sufficient to produce insensibility; and all parts of the brain being pressed on alike, the insensibility was not partial, as in one of the cases he had mentioned, but total and general.

Mr. BAILEY said that, as a practical man, he could positively state that all the symptoms met with during the administration of nitrous oxide were certainly not due to asphyxia. In the course of three or four respirations the carbonic acid was cleared from the lungs, the nitrous oxide got into the blood, and from some cause or other a state of insensibility was produced. Whether this was due or not to pressure on the brain he must leave others to determine by experiment, though he could scarcely have conceived that the pressure on the brain could be so great as it appeared to be from what Dr. Buxton had stated; but there could be no doubt that the effect of administering the gas was to produce a condition of insensibility to pain.

With regard to the practical question as to the best method of

giving the gas, his own practice was to give the patient a free flow of gas with an opening expiratory valve, doing away as much as possible with the supplemental bag. Of course this plan was not as economical as the other,—he found that on an average each patient took about seven gallons of gas; and no doubt the experiments of Mr. Coleman and of Mr. Clover showed that after a few respirations nearly pure nitrous oxide was expired. Still his experience was that by giving the patients a free supply of pure gas a more perfect anæsthesia was produced.

Was it a fact that fatal results might result from giving the gas? In all his experience he had only had three cases in which ill effects were produced by it. In two of these the patients simply ceased to breathe, and had he not at once resorted to artificial respiration, he would, he feared, have lost his patients. The other patient was a girl who, three or four days after taking the gas, got into a sort of nervous condition which caused her to wander about in a purposeless manner, and for a time she appeared to be really very ill. This was an effect which, he confessed, he did not understand; but the broad result was, that when the patient obtained pure gas no ill results followed, except in an almost infinitesimal proportion of cases.

Professor V. HORSLEY said he was very glad to hear from Mr. Bailey that the results of his practical experience had been to convince him that the effects of the administration of nitrous oxide were not due to asphyxia, but rather to some special toxic action. Dr. Buxton's experiments, as well as those of others who had gone before him, had, he thought, plainly demonstrated this fact. With regard to Mr. Braine's suggestion that the effects of the gas were produced by mechanical means, this could easily be proved or disproved by a single experiment. The removal of the upper part of the cranium in an animal was not an operation of any great difficulty or danger to life, and if this were done to an animal which had been anæsthetised by the gas, the animal, if Mr. Braine's hypothesis was correct, would at once recover consciousness, and it would be impossible to anæsthetise it further. He thought, however, that the result of the experiment would be to show that the gas did not act in the mechanical manner which had been suggested. It seemed to him that Dr. Buxton had almost exhausted the subject from an experimental point of view.

Dr. FREDERIC HEWITT said, with regard to the circulatory changes during nitrous oxide narcosis, he had found, by the observation of a considerable number of cases, that the pulse was usually reduced in

volume and increased in frequency. In many instances the radial pulse became almost or quite imperceptible towards the end of the administration; whilst the sudden transition to a full and slow pulse directly a breath of air was inhaled after the removal of the face-piece was a marked and usually constant feature of the administration. He thought that there was still room for inquiry concerning the condition of the systematic venous system during the inhalation of nitrous oxide. It seemed probable that considerable venous engorgement occurred, as Dr. George Johnson believed; but, as this condition would ensue in asphyxial states, and as the line of demarcation between nitrous oxide narcosis and asphyxia was, in our usual modes of administering the gas, hardly capable of definition, it became a difficult matter to know how far the circulatory changes of nitrous oxide narcosis, when the anæsthetic was administered by the methods commonly in use, were to be explained by the absence of oxygen, which necessarily existed. That the phenomena of nitrous oxide narcosis were not entirely due to asphyxia Dr. Buxton had shown; indeed the very fact of our being able to induce the state of general anæsthesia by nitrous oxide in the presence of oxygen, as by Bert's method, was sufficient to establish this fact. There could be no doubt that, in ordinary methods of administering nitrous oxide, the oxygen present in the respiratory passages, as well as the oxygen of the circulating blood, became *rapidly* displaced; and he (Dr. Hewitt) therefore ventured to point out that due allowance should be made for this fact when comparing the displacement of oxygen by means of nitrous oxide with the more tardy disappearance of the oxygen in many of the asphyxial conditions to which Dr. Buxton had compared nitrous oxide narcosis.

With regard to the respiratory phenomena which characterised the administration of nitrous oxide to human beings, he had observed a peculiar sequence of events in most cases which he had met with. If the finger were placed upon the larynx throughout the administration, and if the inhalation were carried to its fullest extent, the following movements of the larynx would usually be detected. As the respiratory acts became deeper, the larynx would be found to descend more and more with each inspiration. This appeared to be due to the condition of hyperpnœa, in which the sudden and forcible chest expansions tended to draw the larynx and the trachea towards the thorax. During the later stages of the administration, however, that is to say, when all or most of the signs of anæsthesia had become established, the larynx would be found, in most instances, to be

moving as in the act of swallowing. In consequence of these movements, respiration became somewhat jerky, as no passage of nitrous oxide could, of course, take place through the glottis during the first stage of deglutition when the epiglottis was in contact with the superior aperture of the larynx. If the anæsthetic were pushed, respiration actually ceased, but the cessation was due to this obstructive condition, the larynx remaining drawn up, as in the first stage of deglutition, apparently by the muscles usually employed for the purpose. Dr. Buchanan had expressed his belief that the thyro-hyoid muscle was the one which pulled up the larynx behind the hyoid bone, and it was probably this muscle, aided by the other elevators of the hyoid bone and larynx, which was the cause of the alteration in the respiratory rhythm which was so commonly met with at the close of an administration.

These movements of the larynx frequently manifested themselves in conjunction with the clonic and tonic muscular contractions which were so familiar to the administrator of nitrous oxide. How far they were to be regarded as dependent upon the same causes as the muscular contractions of the extremities he would not say. His own impression was that all the tonic and clonic phenomena of nitrous oxide narcosis should be regarded as epileptic in origin, using the word epileptic in its widest sense, as suggested by Professor Horsley in his lectures on epilepsy. Further than this, it seemed to him that the movements of deglutition to which he had referred, were, in a way, preservative to the patient, and accounted for the great safety of the anæsthetic. The careful observation of cases had led him to the conclusion that the embarrassment to respiration which characterised the administration of nitrous oxide carried to its fullest extent, was, in reality, due to the form of obstruction he had described. If the face-piece was not removed when symptoms occur, respiration would refuse to proceed.

There was one other point in connection with this matter. It was known that pulling forward the tongue in cases of respiratory failure under nitrous oxide was often successful in re-establishing breathing. Now, when the epiglottis has been allowed to come into close apposition with the superior aperture of the larynx, by reason of the persistence of the first stage of deglutition, it was probable that by forcibly pulling forward the tongue, the epiglottis would be dislodged from its dangerous position.

Concerning the practical aspect of the question, he felt himself

totally unable to agree with Dr. Buxton's remarks. He was of course aware of the serious disadvantages of allowing a patient to inhale, from the commencement of the administration, a limited volume of nitrous oxide over and over again; and he wished distinctly to say that he had never advocated such a method. The lungs should *always* be first washed out, as it were, by pure nitrous oxide; and then, in his opinion, it was of great advantage to allow the patient to take a certain number of to-and-fro respirations, the lungs having by this time become almost entirely free from residual air. He had had three year's experience of the method he advocated, and had published the results which he had obtained. The advantages of this method of administration over the "open" method—that in which every expiration from first to last was allowed to escape—were briefly these:—The period of anæsthesia was undoubtedly prolonged, and the nature of the narcosis was very satisfactory; whilst, in consequence of a smaller volume of gas being required, the apparatus for the administration was rendered extremely portable. He had never met with any unpleasant effects which could be attributed to this method. That the period of resulting anæsthesia was longer than that obtained by the "open" method he had shown in a recent communication to one of the Journals.

A very small amount of oxygen from the residual air remained in the current of gasses for a longer period when a little to-and-fro inhalation was permitted, and hence respiration continued for a longer period. The explanation of the longer anæsthesia was also not far to seek. Within certain limits, and other things being equal, the more nitrous oxide the patient could take up, the longer would it take for its elimination to occur, and hence the longer would he remain unconscious. This was often seen in ether or chloroform narcosis, analogous in many respects to that of nitrous oxide. The objection which Dr. Buxton had mentioned concerning the to-and-fro respiration of nitrous oxide, viz., that carbonic anhydride and other effete respiratory products remained in the lungs, was hardly to be regarded as of importance. He (Dr. Hewitt) had shown by analysing the contents of the bag after 8 to-and-fro respirations—the lungs having previously been washed out by 25 respirations of pure gas—that the percentage of carbonic anhydride did not exceed '64. With respect to the other respiratory impurities he could only say that they could hardly exert any prejudicial effect when the administration was conducted in the manner he suggested, for it was not necessary that many to-and-fro

respirations should be taken, and as he had before said, he had never known the slightest unpleasantness from the method described.

In conclusion, he would offer his best thanks to Dr. Buxton for his interesting paper. The questions raised were of great difficulty in the present state of our knowledge of the functions of the nervous system ; and until physiology had taught us more concerning this and other collateral subjects, it was not likely that the precise mode of action of nitrous oxide would be capable of definition.

Dr. Buxton having replied the Society adjourned.

JUBILEE DINNER

OF THE DENTAL HOSPITAL OF LONDON.

IN celebration of the Queen's Jubilee, a dinner in connection with the Dental Hospital of London was held at the Hotel Metropole, on March 10th, Sir James Paget, Bart., F.R.S., in the chair. There were over 170 gentlemen present ; and, though subscriptions on behalf of the charity were not solicited, the gathering was a great success.

The usual loyal toasts having been honoured,

The CHAIRMAN, in proposing " The Dental Hospital of London," said he would now ask them to drink the toast for which, or in relation to which, they had met especially that evening, " Prosperity to the Dental Hospital of London." They were not to do more than indirectly promote that prosperity, for their purpose was—and he was sure they would all feel they might venture to do so—rather to boast of its present prosperity, and to hope that it might long continue. Even those who only saw the Hospital from time to time could not but observe how well it had prospered, how much it had done, and how much good it was doing. Viewing the Hospital simply as a charity, it was hard to estimate the good it was year by year doing ; for example, it was hard to estimate the happiness which was given to the 40,000 people in one year, 4,000 he believed within the last month, who had been recipients of its benefits. They could not estimate the good that was done ; and yet, he supposed, there were few who had passed through their life without having an opportunity of appreciating the skill of a dental surgeon. Consider the comfort they had from the teeth. That very evening the great part of the enjoyment of a good dinner was due to them ; to-morrow

their comfort would in some way be determined by the way in which their teeth had been judiciously employed. Let each of them multiply this pleasure by 40,000 and they would more nearly estimate the benefits conferred by the Dental Hospital of London. Besides that, let them remember the influence of the teeth upon the general health. He was not going into dental pathology that evening. There they stood, on the boundary between the dead and that which is to be living; and upon them depended often the first and principal step in digestion, and what should be the progress from the dead towards the living, and what should be the value of the living texture which had begun to form. He might speak of the teeth as affecting appearance, but that was a view of the subject which he would leave to the female sex; indeed, he was doubtful whether personal appearance was an advantage to the male sex; but he seemed to be wandering from the Dental Hospital. Let him say that it performed this good—that it was the best institution of its kind in Europe, if not in the whole world. It was the best fitted with chairs, such as would in other hospitals be called beds; in size and extent, and best fitted with furniture and apparatus; the best in its arrangements, and the most complete in the readiness with which its help was given, and he believed he might add the most complete in the skill of those who exercised themselves in it. But he thought the utility and value of the Dental Hospital was not half measured when they spoke of it only as a place for the remedy of existing dental trouble; it was also the Dental School in London. The union of charity with science, the union of charity with education, were the means by which charity communicated itself a hundredfold. If he spoke of the Dental Hospital as the best of its kind, so he believed he might justly speak of the Dental School. It had eighty students, and all those taught had the opportunity of learning the whole art of dentistry from the beginning to the end; learning it through experience, learning it under the best examples and with the best teachers. As an old teacher he might say there was another benefit conferred by teaching, viz., the teaching of the teachers; this he knew well enough, that no one was educated as much by teaching as the teachers. To rely upon the judgment of the public was quite fallacious and misleading; the judgment one should look for was the opinion of those who were duly qualified

to estimate their merits and acquirements. He ventured to say that he thought it might be hoped, and even expected, that out of this school, with its scientific teaching, there would arise at least some few who would give themselves to the profounder study of all that the teeth could teach. They should always remember that two of the finest monographs in their language were those by John Hunter and Richard Owen, that the greatest contributions to science in general had been done by the authors of monographs, that is, by such authors as will bring to the study of any single central subject a large view of the whole of the sciences with which it is allied. That was within the range of every student of dentistry, if he would but use his opportunities; the paleontology, the natural history, the pathology, the whole study of teeth in health and disease, and not only so, their relation to the whole organism; surely here was ample field of investigation. He had observed lately in an admirable address by Mr. Tomes one of the difficulties in the pursuit of science which belongs to the younger members of the dental profession, which did not—unhappily perhaps—affect the branch with which he was associated; viz., that as soon as they were fit for work, they had so much work to do they had no time to do other things. Well, there were two good exceptions, which if Mr. Tomes were present, he should mention before him—viz., himself and his father, Sir John Tomes, both of whom had become Fellows of the Royal Society as the result of their scientific attainments and pursuits; but these were examples of men who, in addition to the business of their lives, which made such heavy demands upon their time, had yet found opportunities for scientific pursuits.

There was but one more ground on which he would recommend the toast to them, and that was the happiness of which this Hospital was the token and symbol—viz., the incorporation of dentists into a legally recognised profession. As they looked back upon this jubilee time of fifty years, they could not but see the great things that had been done: the vast difference in their position now and what it was fifty years ago. There were indeed then many distinguished men who gave themselves to their work who, having regard to the disadvantages under which they laboured, commanded their admiration; but these gentlemen were not welded together in one body; and below them there were able men, but there was no separation between them and the village

blacksmith or carpenter, or anyone who, having failed in every other calling, took to dentistry. There was no limit to the extraction of teeth and the fracture of jaws that went on throughout the country. This was intolerable, and at last the dentists thought they would work themselves into a body which should be legally recognised. Tomes and Saunders were amongst the first, with Lawrence and Arnot and Green, three of the strongest members on the Council of the Royal College of Surgeons, to give their energies to the attainment of this end. First they formed their plan, then they gained their incorporation, then they founded their school; well, from this time onward, they might be sure they would gain in public estimation. None would be admitted who were not qualified; all would be educated, all would maintain amongst themselves the highest repute. Surely these were grounds enough on which they might drink prosperity to the Dental Hospital of London; and looking back upon the great prosperity it had enjoyed up to this time, they might be encouraged to look forward to still greater prosperity in the future. It would be obvious whose name he should connect with the toast; he might have proposed it for his long, honourable and useful life. He might have proposed it because of the approval which Her Majesty had graciously signified by the distinction she had conferred upon him: but he proposed his health with this toast because of his munificent bounty to this Hospital. He had employed his well-earned wealth to the highest and best purpose within his own profession; he had thus made himself a model for them all and, he would add, for all who would come after him. He gave them "Prosperity to the Dental Hospital of London," coupled with the name of Sir Edwin Saunders.

Sir EDWIN SAUNDERS, in reply, said he believed he ought to express regret that the agreeable duty of responding to the toast had not fallen in abler hands, but he would spare them that well-worn commonplace and frankly accept the situation on two grounds: first, the unenviable one of seniority, for he was the sole survivor of the original trustees of the Dental Hospital, and the senior of Sir John Tomes. His second ground was that he was responsible for the removal of their institution from Soho Square to its present larger home in Leicester Square, which took place exactly thirteen years ago that very day, and was so managed as not to interrupt the working of the Hospital for more than that

one day, which was a public holiday. In proposing this toast, their Chairman, Sir James Paget, had stated this case with so much fulness and fairness and with so much generous appreciation of what they had accomplished and of what they were now doing, in such felicitous terms, and with all the charm to which they were accustomed in his utterances, that there was really very little left for him (Sir Edwin) to do but to give expression to their thanks for the manner in which he had proposed the toast, for his presence there that evening, and for the cordial reception which the toast had obtained.

The primary idea in founding the Dental Hospital was to supply the missing link in the golden chain of charitable institutions, by means of which the highest skill and the most humane treatment were brought within the reach of the humblest and the most indigent, and by which that great gulf, which too often existed in this world, between Dives and Lazarus was, to some extent at least, bridged over, and then, as works of mercy are twice blessed, blessing him that gives and him that takes, there followed the inestimable advantage and opportunity of acquiring technical knowledge and manual skill and dexterity to those who might desire to enter the profession. Of the extent to which this was appreciated was evinced by the new demand quite recently put forward for a further enlargement of the Hospital and School; for however perfect the arrangements might be in the Dental Department of the Hospital, they could never be made to meet the requirements of dental surgery in its present advanced state. There was, perhaps, no part of their organism which was so intimately associated with pain throughout their life as their teeth; in infancy the earliest dawn of conscious existence was marred and blurred by a dim consciousness of suffering; the joyousness and elasticity of childhood was overshadowed by the change from the temporary to the adult set; by the middle of life they were a constant source of anxiety, if not of suffering; and in old age they did not leave us without giving us much pain. A distinguished statesman, who was always indebted to their profession for health and comfort of life, not to say powers of oratory, speaking of his earlier vivid recollections, said that his earliest recollection was the birth of a sister, and he distinctly remembered, as they sat in silent wonder, his brother, his senior by some four or five years, with a deep sigh suddenly exclaiming "Poor little thing! She little

thinks what is before her; that horrid Dr. Stewart"—"that horrid Dr. Stewart" being the family physician, accoucheur, and, most horrid of all, dentist; for, he added, at that time, some seventy years ago, Liverpool did not possess a qualified dentist.

He (Sir Edwin) thought it was quite in accordance with the fitness of things that the first suggestions with a view of abolishing pain should have proceeded from their specialty; it should never be forgotten that that inestimable boon, anæsthesia, was given to the world through the medium of a successful operation in dental surgery; and he would add that it was due to the spirit of devotion to duty and self-sacrifice of those who had taken their specialty under their charge that this great boon, under certain necessary limitations, was freely offered to the suffering poor. In the name of the Managing Committee, of the staff, and of all concerned, he begged to tender their sincere thanks for the way in which the toast had been received.

Mr. JOHN WOOD, F.R.S., in proposing "The London School of Dental Surgery," said that he did so with the greater satisfaction because, in the discharge of his duties at the Royal College of Surgeons, he had had many opportunities of observing the efficiency with which the students of the School were prepared. Put before the pupils on these occasions, interesting to the examiners, no doubt, but very horrible for the examined, they would find a series of skulls of lower animals reaching up to man, and if the question was asked, how do these bear upon dental education? it would be answered it is accelerated by the wider view obtained; and further, no man is made a worse operator by knowing the structure of the compound grinders found in many of the lower animals. It was not in one point only that the dental art touched upon scientific knowledge; few modern discoveries had had more beneficent results than the discovery of ether. This School of Dental Surgery had not been content with "filling in," if he might use a dental phrase, the crude effects of science, but they have known how to "extract" the effete and useless, and, what was of more advantage still, they had known when to "stop."

Before concluding, he could not refrain from alluding to the very eloquent remark of their chairman as to the great advantage of having a dental school in the centre of this great metropolis, in the midst of the tooth wearers and tooth bearers. For their services in the cause of humanity, for their services in the cause

of technical education, for their services in applied science, he thought they owed the dental profession their best thanks; and these thanks were not rendered the less hearty because of the recent experience they had had in the hospitable way they had been allowed to use the run of their teeth, and the scientific masticators they had possessed by God's providence and man's ingenuity. He begged to propose the toast of the "London School of Dental Surgery," coupled with the name of the Dean, Mr. Morton Smale.

Mr. MORTON SMALE, in reply, referred to the great number of dentists educated at the School—dental surgeons who had done much for their profession. He said the school was a very important factor in the Dental Hospital of London; the staff, even though willing to do all the work, could not possibly do it unaided by her students, as witness this month's report of 4,369 operations. It was impossible for the Hospital to succeed without her students. Without the students, they would have no School; without the School, they would have no teachers; and without the teachers, where would their Hospital be? There was another Hospital which did good work, and which did not receive all the support it deserved. There were several of the staff present that evening, and he was glad to say there was no rivalry between them. The crowding in the Dental Hospital of London was very inconvenient, not only to patients, but also to students; and the time would come when they would have to appeal not only to the public but to them and he believed they would be ready with two hands, a begging and a helping hand. The London School of Dental Surgery, he said it without hesitation, was the best in the world, and with the help of his hearers the position should be maintained. In the name of the staff, the teachers, and the students, he begged to thank them for the cordial manner in which the toast had been received.

Mr. S. W. SIBLEY proposed "The Royal College of Physicians and Surgeons," and in doing so briefly touched upon the struggles of dentists towards organization, incorporation, and finally, affiliation with the Royal College of Surgeons. He mentioned several names held in honour by the profession, and concluded by coupling with the toast the names of Sir Risdon Bennett and Mr. Christopher Heath.

Sir RISDON BENNETT returned thanks on behalf of the Royal

College of Physicians, and Mr. CHRISTOPHER HEATH replied on behalf of the Royal College of Surgeons.

The toast of the "Visitors" was proposed by Mr. S. J. HUTCHINSON and responded to by Dr. BRISTOWE; and that of the "Chairman" by Mr. S. CARTWRIGHT.

Some excellent singing added to the enjoyment of a very successful evening.

CORRESPONDENCE.

A VICTORIAN SCHOLARSHIP.

To the Editor of the DENTAL RECORD.

SIR,—I must apologise for not answering your letter concerning the proposed "Victorian Scholarship for Dental Students" in time for the insertion of my opinions in the March issue of your journal. The bereavement in my family, announced in your obituary column for that month, must be my excuse, as it caused me to overlook your letter.

I may say I am a very strong advocate for Scholarships and other stimuli for encouraging talent that may lie neglected for the want of means to pay the necessary fees.

With all respect to the opinions of Mr. Parsons Shaw, I believe that the lad who has the energy and determination to *earn* his right of hospital study is the most likely one to make the best use of his opportunities when they present themselves to him. My experience tells me that the pampered children of wealth are not *usually* the individuals who turn out the "bright and shining lights" in any position in life. We value most that which has cost us most pains in the attainment. I grant that a smart superficial young man may occasionally gain an honour to the exclusion of a more thoroughly proficient opponent; but it is not the rule.

I also greatly object to the system of "cramming" so prevalent in our schools. But why is it principally injurious? Because the young brains of the children are not sufficiently developed to stand the strain of steady hard work. But our proposed "scholars" are no longer children. They are lads fresh from school, with brains at their best, thinking themselves men, claiming the liberty of men, when in reality their characters are still unformed. This is the critical time of life which decides the fate of the man. Give him a definite goal to aim at, an ambition to satisfy, a distraction from the everyday temptations to vice which beset a youth on all sides, if he have spare time on his hands, by filling the void with intellectual work; and though he fail in winning the Scholarship or prize he has studied for, he has gained a far more precious treasure, "concentration of purpose," and most probably a love of study. That boy's

life has been steered into its proper course; the chances are it will keep in it.

A definite object of this kind, which is to save the parent's pocket, will compel the lad to seclude himself from the usual family room, where talking is sure to prevent serious study. I consider the surest way to set a lad right is to let him have his books, &c., in a room he can call his own, away from the family, and he will not be likely to loaf about the streets for something to occupy his evenings, as so many of our young men do.

Then I say God-speed all Scholarships or other stimuli to study. The one now under discussion has my most hearty sympathy, which I shall hope to express in a more direct form when the time comes, as I sincerely hope it will. The sum of £2,000 is not a large one, if each contribute his mite; and we could not have a better or more fitting occasion than now, when all true Britons seem to have their hearts and pockets opened by their loyalty to the respected lady who fills our throne.

Kindly pardon the length of my letter. The subject is one that interests me much.—Yours faithfully,

FREDERICK ROSE,
Dental Surgeon and Registrar, Liverpool Dental Hospital.

GOSSIP.

A CONCERT will be given at St. Andrew's Hall, Newman Street, Oxford Street, W., on Monday, April 25th, for the benefit of Mr. James, for some years assistant to the Dental Manufacturing Company, in their sales department, but who has been obliged to relinquish work in consequence of entire failure of his sight. Tickets may be obtained at the Dental Company's depots, London and Manchester, and also from the several dental depots in London, who have very kindly offered to sell tickets.

MR. FRANK HAMPTON GOFFE, L.D.S.Eng. and Edin., has been elected to the post of Dental Tutor to the Queen's College, Birmingham.

DR. KLEIN, in studying the etiology of scarlet fever, has found a species of micrococcus in ulcers of the cow, which when cultivated in nutritive gelatine, or serum of blood, is capable of producing in animals a disease identical with scarlet fever in man. Further, the cultivations of two cases of scarlatina were used for infecting calves. In both instances a disease both cutaneous and visceral, identical with that produced by inoculation from calves, resulted.

BEAUTIFUL microscopical objects for polarized light are produced by the action of undiluted fluoric acid on an ordinary glass slide, the results varying with the composition of the glass acted upon. The best results are to be obtained by using slips of thin polished plate and the following process:—Cut a circular hole in a piece of sheet modelling wax, warm the side slightly and make the wax adhere well to it, so as to form a fluid-tight cell; into this put four or five drops of the acid, watch its action closely when the glass has acquired an opaque film, which will be in from three to five minutes, wash it with a stream of warm water, finish with a camel hair pencil. Remove the wax and dry the slide. The result shows crystals of silicon fluoride which require no mounting.

FACTS are everything, and philosophy without facts is a sentimental dream.—Myers' "*Modern Essay*."

THE post-mortem detection of chloroform seems now to be established on a firm basis. Four weeks after death, even when the cadaver has been exposed to the air of a summer heat, no substances were formed which interfere with the test.—*American Chemical Journal*.

THE virus of gangrenous septicæmia and symptomatic anthrax have the power of fermenting nitrogenous substances, as peptone, albumen and yolk of egg. The products are ammoniacal compounds, and carbon anhydride is evolved. These facts confirm the analogy between zymotic virus and ferments.

THE once strongly marked line which defined the boundary between the organic and the inorganic seems year by year to become fainter and fainter until we need some more subtle sense than mortal vision to descry its course. This is what Professor John Judd told to the members of the Geological Society only a few weeks since. "It is a circumstance of no small significance that no definition of *life* which has yet been proposed will exclude the kind of processes which we can now show to be continually going on in mineral bodies." It may seem paradoxical, but it is nevertheless true, that the "vitality" of minerals is much greater than that of plants and, *à fortiori*, than that of animals; and this is the direct consequence of their less complex and more stable chemical constitution. A quartz crystal develops to certain

dimensions in accordance with the natural laws of its being, and when the necessary conditions of growth cease to environ it, its increase is arrested. But the crystal still retains its "vitality;" that is, the power of further development which is dependent on its particular organisation, or molecular structure. We may destroy that organisation in an instant by the action of hydrofluoric acid or an oxyhydrogen flame, but unless the organisation be brutally stamped out, every fragment of it retains, not the promise only, but the very "potency of life," for let but the necessary conditions again environ it, and the fragments will redevelop, having as much claim to identity with the original one as a man has with the baby from which he has grown. Cavities containing carbonic acid and other liquids, with bubbles in constant motion, remind us of the mysterious creeping of protoplasm in the hair of a nettle and the dance of blood corpuscles in the foot of a frog.

WE refine our methods of research until we cut from under us the foundations upon which our knowledge has been built, and we have to unlearn and learn afresh the very principles upon which our experience is based.

WE have only to turn to the results of Dr. Youngman in the implantation of teeth to feel that if his theory be true, we must relearn our physiology. He tells us that the vitality of the periosteum of a tooth remains almost unimpaired for many months after its removal from its alveolar home. To this principle he owes the success of his operations. Surely his success must rather be due to encystment. Time alone and further demonstration can decide this interesting point.

THE electric lighting of mines has been considerably advanced by the use of a lamp, in which the globe containing the light is placed within a second globe filled with water, the maintenance of the light being made dependent on the position of a float in the water globe. If the external globe be broken, the escaping water displaces the float and cuts off the current, while, in the event of the inner globe giving way, the inrush of water extinguishes the light.

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EXTRACTS FROM LECTURES ON OPERATIVE DENTAL SURGERY.

By WILLIAM ST. GEORGE ELLIOTT, M.D., D.D.S.

(Delivered at the National Dental College.)

(Continued from page 155.)

AMALGAM.

AMALGAM, believed to have been first introduced by M. Taveau, of Paris in 1826, was then composed of pure silver mixed with mercury; subsequently coin silver replaced the more expensive pure metal. In 1848, Dr. Evans, of Paris, brought out a new alloy of tin and cadmium. This, however, was soon found to stain the tooth yellow, and was soon withdrawn from the market.

From the time of its introduction up to the present, the use of amalgam has extended enormously in almost all countries where an attempt is made to save the natural tooth.

In America, however, it came upon the scene when gold had almost a monopoly, and being introduced there by two quacks (the Crawcours), it was not at all well received, as any one who has done much work in gold can easily understand. The pecuniary success, however, of these two quacks led a few dentists, here and there, to take it up; but the opposition from the profession was so great that it was brought before the American Society of Dental

Surgery, who, in 1841, reported that lithodoan mineral paste, and all other substances in which there is mercury, was objectionable for stopping teeth.

The Committee of Enquiry reported, "That the use of all such articles was hurtful, both to the teeth and every part of the mouth, and that there was no tooth in which caries in it could be arrested, in which gold could not be employed."

In 1843 the same Society passed a motion to the effect that the use of amalgam was malpractice.

One of the earliest forms of amalgam, sometimes known as Townsend's, contained silver 4 parts, tin 5 parts. For a long time the presence of copper, as found when coin silver was used, was considered objectionable; but as the use of the two pure metals alone did not show any advantage, as a tooth saver, over the older forms, and as now we know that the anti-septic character of the copper is an important ingredient where tooth saving character is desired, and where the colour, which is more objectionable where copper is present, is not considered important.

Probably the most commonly used amalgam in Europe is Sullivan's, or copper amalgam. It is made of copper powder and mercury, and, although there is some difference in the mode of preparation, the following will serve as an example:—Copper dust 25 to 30 parts, precipitated from a solution of the sulphate, is put in a mortar and mixed with acid sulph., specific gravity 1.85; there is now added 70 parts of mercury, with constant stirring; it is then well washed with warm water, divided into convenient size pieces, and set aside to cool. When it is required for use, it is heated in a ladle, crushed and triturated in a mortar, when it will be found soft and ready for use. Any softness required may be obtained by the addition of more mercury. Some manufacturers direct that it should be washed in a solution of sulphuric acid, and subsequently in alcohol, to remove the dirty colour; but I do not think it has been proved to be a useful process. We are sometimes told that it does not discolour the teeth, but I fancy it is like all other amalgams in this respect, that it discolours the most in soft, poorly-formed teeth. In some cases, while the stopping becomes quite black, it does not stain the tooth in the least. In many cases the discolouration is very considerable, and sometimes extreme; and there can be no question

that of all the amalgams in use this is the worst in this respect.

There is another objection to Sullivan's amalgam, almost as serious, and that is the wasting away often noticed on the surface. Sometimes in two or three years this amounts to one-fourth or one-eighth of the entire filling. This is not always, nor indeed generally the case, but it is sufficiently frequent to be considered a serious objection. Now, as the great advantage possessed by Sullivan's consists in the anti-septic character of the copper employed, can we not get a similar result without the objection stated? Any good amalgam containing ten per cent. copper will probably contain as much virtue, and will have the additional advantage of not being in itself so black, nor will it stain the tooth so badly, and of course will not be open to the objection of partial solution or disintegration.

The basis of nearly all amalgam consists of silver and tin, the relative proportion varying greatly, 6 of silver to 4 of tin, to 4 of silver and 6 of tin.

Dr. Darby, of Philadelphia, recommends the following:—Granulated silver 4 ozs., pure tin 5 ozs., platinum 4 dwt., pure gold 4 dwt. The silver is melted first, when sufficiently hot the platinum is added, then the gold, and lastly the tin; mix and pour. You will notice that this is Townsend's, already referred to, with some additions.

"Townsend's Improved" consists in increasing the silver and decreasing the tin.

Lawrence's amalgam consists of equal quantities of silver and tin, with the addition of about 6 per cent. copper, probably contained in the coin from which it was made.

Dr. Flagg states that the "Standard" (Eckfeld & Dubois) is composed of silver, tin, gold and copper, probably 50 of silver, 32 tin, 8 gold and 10 copper. Gold is now generally considered a desirable addition to amalgam, and is said to not only hasten the setting but imparts "fine grained plasticity," and helps to control colour; it is added in different proportions by manufacturers, from 2 to 10 per cent.

Dr. Flagg considers antimony as advantageous, but as it renders the amalgam very dirty, he does not recommend it. He considers zinc an excellent ingredient, as it prevents contraction, and increases the whiteness.

Platinum, although found in many amalgams, has not, I think, proved itself of value. My own experiments, however, have not as yet included platinum; when added it is usually from 1 to 10 per cent.

Bismuth I have found useful in giving plasticity to the mass, but beyond this, I have not yet tested it.

Aluminium acts remarkably; when over 10 per cent. it prevents amalgamation and generates excessive heat; when reduced to 2 per cent. it amalgamates poorly, and in fact seems to be detrimental to the alloy. We know much more about amalgam to-day than we did twenty years ago, and yet we do not know a great deal. Any one who has done much experimenting with this material recognizes fully the complexity of the problem. A slight alteration in the amount, purity or character of the ingredients, will make a materially different article. More than this, the mode of melting, and subsequently granulating, the amount and character of the mercury used; all have an important bearing.

One cannot say that a better alloy than any now in the market is not possible or even probable, yet it is not clear in what direction the improvement will be. Copper is essential as a germicide, but copper blackens. We have in our alloys most of the qualities we require, and, if we could control the colour and yet retain the anti-septic character, we should have what we want, but when we think of the secretions of the mouth and their varied character, we know not where to turn that we may get the virtues of our present alloys without their objections. Could we have an amalgam without discoloration, gold would lose some of its hold upon us.

Several years ago I tested a variety of amalgams; the result we now have before us, taken from a paper read before the Odontological Society, February, 1884. The test for shrinkage was what is called the specific gravity test, which is, that the change in size in water of a piece of amalgam will show itself by its change in specific gravity. A balance, turning at the $\frac{1}{1000}$ of a grain was used; the resistance to transverse strain was ascertained by crushing discs of amalgam 7.50 mm. in diameter by 1 mm. in thickness. These discs were first moulded in steel rings; on hardening they were turned up and measured as to thickness by a micrometer, measuring up to a $\frac{1}{100}$ of a mm.; these discs were crushed by a measured force in lbs. Fifteen discs of each amalgam were used.

SULLIVAN'S AMALGAM.

Interval between the observations in hours.	Dry. mgs.	Medium. mgs.	Soft. mgs.
.12	1,681.5	1,806.3	1,810.5
.3	1,703	1,811.5	1,817.5
.4	1,710	1,814.3	1,821.5
.4	1,709.2	1,815	1,819.4
12.45	1,710.3	1,812.2	1,822.5
4.15	1,713.6	1,813.5	1,822.5
6.30	1,715	1,815.5	1,822.5
13.45	1,715	1,812.5	1,822.5
.4	1,715.3	1,811.5	1,820.2
7.30	1,710.5	1,811.5	1,818
11.30	1,706.1	1,808	1,817.7
.5	1,706.5	1,808	1,817.7
7.30	1,708.1	1,808.3	1,818.2
11.30	1,709.1	1,808	1,820
.6	1,708.9	1,809	1,818.6
.6	1,709	1,811.9	1,827.7
.36	1,706.7	1,809	1,818.6
4.15	1,706.7	1,808.4	1,820.9
6.15	1,707.5	1,809.3	1,820.9
—	1,710	1,807.5	1,818.5
Results...	- 28.5	- 1.2	- 8

CONTRACTION.

The Dry contracted	..	...	...	mgs.	28.5 in	mgs.	1,681.5)
„ Medium „	...	...	...	1.2	„	1,806.3	7 days.
„ Soft „	...	...	...	8	„	1,810.5)	

TABLE OF SHRINKAGE, SPECIFIC GRAVITY, AND BREAKING STRAIN OF 13 AMALGAMS.

Amalgams.	Shrinkage (—) or Expansion (+)			Specific Gravity.			Breaking strain in lbs. (Discs 7/30 m.m. + 1 m.m.)		
	Dry. mg%.	Medm. mgs.	Soft. mgs.	Dry.	Medm.	Soft.	Dry.	Medm.	Soft.
Stewart's Sullivan's	-30.9	-5.2	-13.5	9.873	12.062	10.342	2	2 $\frac{2}{10}$	—
Sullivan's	-28.5	-1.2	-8	10.773	12.651	11.647	3	3 $\frac{7}{10}$	4
Bonwill's	-24	-14.8	-10.5	8.695	9.202	10.101	9 $\frac{1}{2}$	10 $\frac{3}{8}$	6 $\frac{1}{2}$
Hallam's	-21.1	-16.3	-7.5	8.620	9.785	9.288	17 $\frac{1}{10}$	10	3 $\frac{3}{8}$
Gregory's	-5	-6.3	-13.9	10.127	9.478	10.476	15 $\frac{7}{10}$	10 $\frac{1}{2}$	12 $\frac{1}{10}$
Lawrence's	-23.5	-6.9	-5	9.081	9.174	9.523	12 $\frac{1}{10}$	9 $\frac{1}{10}$	2 $\frac{7}{10}$
Fletcher's, Flagg's standard	-2.6	-6.6	-2	9.690	9.174	9.433	15 $\frac{1}{2}$	5 $\frac{4}{10}$	2 $\frac{2}{10}$
Do. extra Plastic	+2.7	-8.7	-5.4	9.934	10.510	9.615	8 $\frac{1}{10}$	5 $\frac{3}{10}$	5 $\frac{7}{10}$
Do. ex. 2nd qual.	-18	+14	-7	9.352	9.95	10.359	6 $\frac{1}{2}$	1 $\frac{3}{8}$	1 $\frac{9}{10}$
Ash's	-10	-7	-1	10.115	9.975	13.439	11 $\frac{3}{8}$	9 $\frac{1}{2}$	10 $\frac{3}{8}$
Davis's, gold ...	-12	-5	-8.3	9.509	9.97	10.071	9 $\frac{2}{10}$	9 $\frac{7}{10}$	8 $\frac{1}{2}$
Do. crystal gold	-22.5	-8.5	-3.5	9.345	10	10.255	11	10	8 $\frac{1}{2}$
Nickold's do.	-13.4	-3	-3	9.514	10.05	10.101	14 $\frac{1}{10}$	9 $\frac{3}{8}$	8 $\frac{3}{10}$

Finally, what position does amalgam occupy in the list of filling materials? That depends on what we wish to accomplish. In some places and under some circumstances, oxy-phosphate is the best; in others, guttapercha. Then again, amalgam may give the greatest durability, or gold the best colour and strength, but, simply as a tooth saver, amalgam is unquestionably, in my opinion, the best. With the same care, it will save more teeth than gold, not only at less expense to the patient, but with less fatigue to both operator and patient. From an aesthetic point of view, it is inadmissible where it will show, and where much strength is essential it is inferior to a thoroughly condensed gold plug.

I hope, gentlemen, you will all be eclectics; use that material which, all things considered, is best for the cavity.

We are, however, vastly indebted to gold, not only for what it has done and is doing to save teeth, but we have to thank it mainly for the development of skill and for the practical elevation of the profession.

I beg to show you some amalgam instruments; the double ended conveyer I have found exceedingly useful, using it almost daily for the last eight years. It requires a little experience to be always enabled to use it, as the amalgam does not readily come out in very large or very small cavities, but by turning the instrument from side to side, using the point as a centre or by catching the edge of the tube upon a projecting portion of the tooth, the amalgam is readily discharged.

Let me exhibit to you a large number of amalgam fillings made in pieces of white celluloid; you will see that they have all appreciably shrunk, as is shown by the leakage, but you will also notice that in every case where I have used varnish to line the cavity there has been no leakage; consequently I now almost invariably use copal varnish to line the cavity first, burnishing in the amalgam with the rounded end of the pluggers.

(To be continued.)

A PROFESSIONAL HOLIDAY.

By GEORGE CUNNINGHAM, B.A.Cantab., D.M.D.Harv., L.D.S.Eng.

(Continued from page 159.)

PROFESSOR MILLER, of bacteriological renown, delivered an address "On the Combination of Tin and Gold as a Filling Material." The first fillings made with this combination of tin

and gold were made by Dr. Abbott, of Berlin, some twenty-five years ago. Until recently, this combination has been little used, partly because of a fear of the possible electrical effects. He maintained, however, that seven years ago he had conclusively proved that electrical currents between dentine and fillings were impossible, and from a prolonged experience in the use of the material, and an extensive knowledge of the results of Dr. Abbott's practice, he was convinced that no possible damage could occur to the tooth from the combination of two metals in one stopping. He claimed the following advantages for the combination of tin and gold as a filling material—firstly, it admits of easy and quick manipulation; secondly, it possesses great durability; thirdly, it is a bad conductor of heat, and fourthly, it is not injured by the admission of moisture. The ease of manipulation he well demonstrated while continuing his address, by filling, in a few minutes' time, a very large crown cavity in a molar tooth, held in a hand vice. He usually takes a sheet of No. 4 or 5 gold foil, lays it on a similar sheet of tinfoil, and rolls these with his fingers into a long loose rope, with the tin to the outer surface, though the results are the same if the gold is rolled externally to the tin. Its employment is indicated in all difficult and inaccessible cavities where the teeth are of poor structure. In very large compound cavities he frequently fills two-thirds with the combined tin and gold, and finishing the remainder with gold alone, by which he is enabled to restore the contour with sufficient strength to withstand the force of mastication, &c. As the material discolours in a time, its use is not indicated in front teeth. In the discussion, Professor Sauer testified to his knowledge of the excellence of the results obtained by Dr. Abbott with this combined filling material. Professor Hollaender called attention to the employment of tin and gold, as mentioned in Quinby's work on Operative Dentistry; but, as Dr. Richter very justly remarked, they must not confound the method recommended by Mr. Quinby with the Abbot method, as the former uses first tin alone then gold alone, one over the other. Dr. Sachs expressed his obligations to Professor Miller for his past instructions in the use of this combined filling material of tin and gold, which he regarded as the ideal filling material for saving teeth of poor structure.

Herr Jules Parreidt, in his interesting paper on "Cysts of the Teeth and Jaws," opposed the opinion of Magitot that all cysts

of the jaw are dentigerous. He holds that just as cysts may arise in other bones, so may a cyst occur in the maxillary bones independently of any dental origin. He admits, however, that the occurrence of this form of the disease is extremely rare as compared with cysts of the jaw of dental origin. He adopts Magitot's classification of cysts into first, follicular, and secondly, periosteal varieties, though he considers that his statement as to the relative frequency of the two classes is inexact, Magitot holding that 51 per cent. of dentigerous cysts are follicular. Herr Parreidt ascribes this error to the fact that Magitot had collected his cases from professional literature in which, as a rule, only the more interesting cases are reported, and that the follicular rather than the periosteal varieties belong to this class. He, himself, had treated twenty-three periosteal, and on the contrary, only two follicular cysts. Follicular cysts he classified into, first, those arising during the embryo-blastic period; secondly, those which take their origin in the odonto-blastic period; and, thirdly, those arising after the development of the crown. In reference to the origin of the periosteal cysts, he thinks that many of them originated in those vascular convolutions similar to the glomerulus of the kidney, which Wedl discovered in the periosteum of the tooth. After describing the development of the follicular cyst, he proceeded to point out his reasons for considering that they might be regarded as cystic degenerated odontomes. He then shortly discussed the connection of the cysts with the surrounding bone and the causes of cyst formations. Follicular cysts have been found to have a traumatic origin, while the periosteal cysts arise through chronic irritation of the periosteum through the root canal when the pulp has died in consequence of caries penetrans. In the diagnosis the yielding of the swelling to touch and its slow growth are especially to be considered; the swelling of the follicular cysts, however, are sometimes very dense and not yielding. The first treatment of the periosteal cyst consists in the removal of the offending tooth, but in the further treatment he does not consider it necessary to endeavour to bring about suppuration of the cyst walls by application of caustics; it suffices to keep the cavity clean until it is obliterated spontaneously by the walls coming nearer together and the atrophy of the cyst follicle. The follicular cyst often requires an operation, but it is not necessary to resect the jaw; it is sufficient to entirely remove one wall of the cyst when

new bone will be formed and all traces of the cavity slowly vanish. If for any reason this operation be declined, the dental surgeon must wait for a breaking through of the contents and then avert any putrescent formation by frequently syringing the cavity. If the cyst is single, and not cellular, healing will gradually result.

In the discussion of the paper, Professor Busch referred to the fact that in the Berlin Dental Institute about twenty cases of periosteal cysts had occurred, while not a single follicular cyst had come under his attention. He also considers that often an abscess becomes a cyst, and in some cases also the cyst gives rise to an abscess.

Herr Ritter described the case of a lady nineteen years old in which three retarded teeth had given rise to three several cysts. As an antiseptic dressing for cysts he had employed, with great success, iodoform ether.

The discussion seemed altogether to point out that Herr Parreidt's disputing of Magitot's statistics was not unfounded.

Dr. Hillischer delivered a long address upon the general use of nitrous oxide-oxygen narcosis, and the respiratory exchange of the gases in administrations of nitrous oxide and nitrous oxide+oxygen. After a somewhat unnecessary history of nitrous oxide, he described the experiments of Paul Bert, Klinkowitch, Zweifel. He then went on to speak of his 12,000 to 15,000 cases of nitrous oxide narcosis, and then how he was induced to experiment with the addition of oxygen until, in the course of practice, out of a total of 2,356 narcosis, in little more than a year, 917 of those were with nitrous oxide+various additions of oxygen. His statistics seemed very carefully prepared, but as his shortest available narcosis lasted in several cases only 10 seconds, and the longest, in one case, 75 seconds, and altogether on the average only 33 seconds, we do not see that anything is gained. He thinks the combination of oxygen with the nitrous oxide produces a condition similar to physiological sleep, and talks of the latter as "sleeping gas," in contra-distinction to "laughing gas." His main contentions are as follows:—

1. That N_2O narcosis may lead in a short space of time to asphyxia and death, in consequence of absence of oxygen.

2. Narcosis with nitrous-oxide + oxygen is capable of considerable prolongation, sufficient for all the necessities of surgical interference without fear of danger.

3. N_2O narcosis causes slight dyspnœa, and in susceptible patients an anxious state of excitement.

4. This state of excitement disappears completely, or almost so, by inhalation of N_2O+O .

5. Cyanosis often produced by N_2O is rare in cases where N_2O+O is administered.

6. The time necessary to produce narcosis with N_2O+O is longer than with N_2O alone, but the narcosis so produced is longer than with the gas alone.

With regard to his opinions on the respiratory gas exchanges, he seems to contrast the oxygen mixture only with the results produced by breathing the nitrous oxide back into the bag, a method of administration which may possibly account for his previously recorded opinion of the results of pure nitrous oxide narcosis. We notice in one table he gives results of six cases of nitrous oxide and one with N_2O+O in the proportion of 9 to 1. We regret we have been unable to gather any fact of importance from such a table.

Dr. Hillischer condemns the method of breathing nitrous oxide to and fro from a bag, in which contention he ought to be supported. The advantages, however, of a maximum addition of ten per cent. of oxygen to nitrous oxide are not yet quite demonstrated.

The gases should only be mixed immediately previous to the administration, as traces of nitric and nitrous acids were found in a mixture which had been allowed to stand for a few days.

The cogent criticism of one *confrère* on reading his paper was "Too much talent in extracting teeth—why these sacrifices?" *Verb. sap.*, and, we trust, Dr. Hillischer included.

Professor Miller gave a short address on "The Restoration of the Contour of Carious Teeth by means of small pieces of Porcelain," which are ground from suitable artificial teeth with a knob or part which projects into the cavity of the tooth and serves as the holdfast to the artificial tip. The cavity is prepared as for a cement filling with smooth even edges and filled with a phosphate cement into which the tip is pressed. The details of this method of restoring contour are given in an illustrated article by Dr. Miller at page 1 of this volume of the DENTAL RECORD. The models which Professor Miller showed in illustration of his remarks were a good example of fine fitting and close adjustment.

Herr Sachs had also employed this method of procedure for

even a longer time and with great success, while Herr Sauer endorsed that experience, and further mentioned the process recommended by Linderer of malletting an ivory block into the cavity for the same purpose, which also made a very durable filling.

Herr Witzel had great doubts as to the durability of these fitted blocks, but Professor Miller assured him that his experience and that of many other colleagues had put aside all doubt as to the excellence and durability of the operations.

Professor Sauer described what he termed a new simplified apparatus for the retraction of prominent front teeth. While endorsing the contention as to the practical nature of this operation, we scarcely thought his apparatus as simple or as effective as that in which levers or spring retractors of piano wire are employed, as in Dr. Coffin's process, or in which a simple metal band or carriage adjusted to the front of the teeth is retracted by an indiarubber band attached to the centre of a vulcanite palate plate.

Professor Sauer also spoke on the use of aluminium bronze in mechanical dentistry, and on which an interesting demonstration took place in his laboratory.

Herr Eysell read a paper on the "Contraction of the Nasal Cavity, arising from a narrow palate and abnormal position of the teeth." He exhibited several preparations in which he contended that by the expansion of the contracted arch he had also enlarged the contracted nasal cavity.

Professor Busch contended that the extension by regulation of abnormal teeth only extended to the alveolar process, and consequently no extension of the nasal cavity was produced.

Demonstrations were again given at the Dental Institute, at which Dr. Göttinger filled a cavity with gold and tin combined, finishing the contour in gold alone. The rapidity with which tin and gold may be manipulated was well illustrated by this able operator, and the tooth-saving property of the combination was well demonstrated by the casual exhibition of some rough but serviceable fillings, executed some time ago by a dental student of a few months' experience.

Dr. Timme, of Hoboken, U.S.A., also gave an interesting demonstration of his method of applying entire and partial gold crowns stamped up from one piece of metal.

Herr Ritter read a paper on "Antiseptics in Dentistry," in which he pointed out the necessity of the use of antiseptic precautions, not only during but after operations in the mouth. He maintained that he could trace the origin of about a hundred cases of diseases of the jaw which had been caused by septic processes occurring after dental operations. He recommends the use of iodoform ether for this purpose.

Professor Busch described his method of making tooth sections and microscopic dental preparations. By means of metal discs continually moistened with a watery corundum paste he is enabled to cut through the large teeth of animals in a short time. He also delivered an address "On the Various Abnormalities in the Number of the Teeth," concluding with some very interesting remarks on the *dentitio tertia*, of which he had had four cases. The majority of supernumerary teeth must be considered as originating from a splitting of the teeth germ, and only in single rare cases could such teeth be regarded as a return towards the typical placental mammalian dentition.

Herr Morgenstein showed a patient in whose mouth was a very successful case of a molar replanted seven years ago. He also briefly described the results of the experiments in replantation performed at the Geneva Dental School.

Herr Warnekros gave an address on "The use of Cocaine in Dental Operations." At a subsequent demonstration three teeth for different patients were painlessly extracted under the effects of cocaine injections.

Herr Vajna also demonstrated the stages of construction of models by means of red copper electrically deposited directly into impressions of the mouth. He recommends this method of preparing models for museums and teaching purposes, mainly from their non-liability to fracture and damage in handling. He also considers them superior to the ordinary metal dies used in the dental laboratory.

Herr Sachs, of Breslau, read a paper on "The Relative Advantages of Contour Fillings and Permanent Separations." He employs both methods according to the age of the patient and the density of the tooth structure.

Professor Miller contrasted, by means of large plaster models, the treatment by means of contour fillings and the V-shaped separations.

Herr Warnekros described the mishaps that frequently followed the exaggerated building up of great gold hills (gold hügel).

Professor Busch, in a few words, brought the business of the section to a close, by congratulating the members upon the success of the first section of dentistry in the Natural Science Association.

(To be concluded.)

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE usual Monthly Meeting of this Society took place on the 4th ult., Mr. CHARLES TOMES, F.R.S., President, in the chair.

A suggestion from the Council that Mr. Bland Sutton and Dr. Dudley Buxton should be elected Honorary Members was very cordially received.

The CURATOR announced several additions to the Museum, amongst them the skull of a young deer, in which the teeth and alveoli were much affected by disease.

Mr. WALTER HARRISON showed a model of an extreme case of double hair lip in a child five weeks old, operated on, with removal of the intermaxillary bones, by Dr. Whittle, of Brighton.

Mr. PENFOLD showed exact copies of instruments found at Pompeii, and preserved in the Museum at Naples, where they were labelled, "Dental Instruments," but they bore no resemblance to instruments now used by the profession, and Mr. Penfold was of opinion that they were intended for modelling clay with.

Dr. W. ST. GEORGE ELLIOTT showed a slight alteration in the Hodge Right Angle which he had made, with a view to overcome the tendency of the points to drop out. It consisted in attaching to the cover of the screw the lock-pin of the early S. S. White Right Angle, and the arrangement effected the desired result.

Mr. ACKERY showed a pair of forceps designed by Mr. T. W. F. Rowney, of Derby, for dividing lower molars after their crowns had been removed. He also read notes of an obscure disease of the upper jaw in a medical student, aged 26, attended with numerous abscesses, which, after lasting five years, was cured by extraction of the first and second left upper molars, and carefully dressing the necrosed alveoli with aromatic sulphuric acid.

Mr. C. V. COTTRELL showed models of the mouth of a youth aged 17 to 18, who had no illness from the time he was twelve months old. Previously to that he had had an attack of

dysentery. His teeth were very yellow and perfectly soft, so much so that they could be cut with a knife. An uncle on the father's side had very similar teeth.

Mr. R. HEPBURN had seen a similar discoloration result from the administration of acids.

Dr. WALKER showed, on behalf of Mr. Humphreys, of Birmingham, the head of a calf with cleft palate extending from the inter-maxillary bone and palate portion of the superior maxillary bone. The two halves of the lower jaw were disunited, and the tongue was also bifurcated for some distance. The animal was otherwise strong and well.

ON THE PATHOLOGY OF RIGGS' DISEASE, OR PYORRHŒA ALVEOLARIS.

By F. NEWLAND PEDLEY, F.R.C.S., L.D.S.Eng.

We must all admit that it is a very unfortunate thing for a disease to be christened after the name of its discoverer, for there is always a doubt whether his description was correct, and even where it is shown that the original interpretation was entirely wrong, the name may long survive to perpetuate blunder and bar the road to a more accurate perception.

How much greater does the difficulty become when a lesion is named after a man who never recorded a description of it.

In the year 1881, at the Medical Congress, Dr. Riggs denied that he had been personally instrumental in attaching his name to the complaint. But we are aware that Dr. Riggs invented a series of instruments for removing tartar buried beneath the gum, and hence the use of his name would wisely be confined to describe a form of treatment by scraping, directed against certain abnormal conditions of the gums, which he recognised as peculiar, but attributed to the effect of tartar.

Years went by and the designation Riggs' disease was retained, although it was used with quite a different meaning to the original, by many who applied it to a lesion of constitutional origin, and not necessarily associated with salivary calculus. To obviate this confusion, the appellation pyorrhœa alveolaris was substituted for Riggs' disease. This more recent name is not free from the objection of being a generic term merely indicating a symptom, and it requires a sharp definition to intimate in what sense we elect to adopt the title. For the general acceptance of the term pyorrhœa alveolaris, by dentists in Europe and abroad, assumes that we all recognise a certain definite disease to which

it is applicable, and when a distinctive title is given to a complaint, a definition should be forthcoming, which in turn should be based on its pathology. Unhappily pyorrhœa alveolaris received a compromising name first, and still lacks a satisfactory pathology. In this dilemma we must, to-night, select the salient physical features and naked-eye appearances upon which we rely to distinguish this particular disease from others to which it bears points of resemblance, to do duty as a definition, and serve as a fixed point from which we can discuss and develop its pathology. Eventually I trust we shall be able to endow the lesion with a name of scientific import.

The local conditions to which the terms "pyorrhœa alveolaris" or Riggs' disease have been applied may be briefly quoted thus from the description of well-known authors. The mucous membrane, especially that adjacent to the teeth, appears deeply congested with venous blood, tumid and thickened, but not filling up their interstices at their necks, and detached for some distance from the surface, from the fangs. A thick foetid discharge may often be pressed up between the teeth and mucous membrane which gives to the breath a very repulsive odour. This condition of things continuing, the alveoli become absorbed, and at times more or less denuded, whilst the fangs of the teeth become coated with a layer of thin, hard, green-brown tartar. Ultimately, the disease progressing, the teeth one after another drop out. The alveolar margin is sometimes thickened in substance. The pain varies, it may be neuralgic from the first, but it is not generally considerable until the periosteum is fully involved.

Various theories have been advanced in explanation of the appearances and conditions occurring in the above complaint. I do not purpose going deeply into the germ theory. Doubtless numerous varieties of germs have been found in the purulent discharge from the alveoli, and an epidemic form of the disease is said to have appeared in Switzerland, and to have disappeared as rapidly as it came. The discharge contained peculiar micro-organisms, but the researches of modern bacteriology would not justify the conclusion that these germs were necessarily the cause of the disease; for even in the case of the well-known bacillus of tubercle, the question remains to be decided whether the bacillus is the cause or effect of the complaint.

American literature supplies us with a "catarrhal theory" for pyorrhœa alveolaris, based on the fact that the alveolodental membrane is continuous in structure with the deeper layer of the mucous membrane. It is suggested that catarrh of the mucous membrane of the mouth

causes sloughing of the alveolodental membrane by cutting off the blood supply. A serious objection to this is that the chief vascular supply to the lining membrane of the alveolus is not derived from the mucous membrane of the mouth. We need also tarry little over another point, which consists in the statement that in some cases of pyorrhœa alveolaris pus was absent. Little importance need be attached to this, for the amount of pus formed is merely an index of the intensity of the inflammation, and the vascularity of the part. Chronic inflammation may well exist without pus, or the pus may be present, though invisible to naked-eye examination, or may be entirely absent at times, though present and visible at others.

The relation of salivary calculus to pyorrhœa alveolaris is a question of great moment, for, in the opinion of many dentists, tartar is the origin and essential cause of the complaint. This is obviously unsatisfactory as regards the ordinary crusts of calculus that are so commonly found clothing the crowns of teeth. All dentists see innumerable cases of this description, in which the gum and socket may recede as the result of the mechanical irritation from the calculus; but there is no considerable separation of the periosteum from the root of the tooth, and simple removal of the tartar and attention to cleanliness arrests the progress of the evil. But grave attention is frequently drawn to a thin layer of calculus that is found upon the roots of teeth, extending upwards beneath the inflamed periosteum of the tooth, and in some cases reaching the very apex of the root. The characters claimed as distinctive of this layer of deposit are that it is nodular, harder, and of a different colour to ordinary tartar; but it must be remembered that the calculus deposited beneath the periosteal pouches is subject to different conditions to that on the exposed portions of the tooth. Old tartar is often hard and nearly black in colour, and that which forms beneath the margin of the gum remains protected from removal by accident, mastication, or the use of a tooth-brush. Tartar mixed with pus is green. The nodular character of the deposit is probably attributable to the irregularity of the surface of the alveolus, and of the inflamed lining membrane, in contact with which the nodules are formed. The fact must not be disregarded that the deposit on the submerged roots is braided during its development with pus and effusions from the inflamed periosteum and gum. The difference in colour is not irreconcilable with the salivary origin of the deposit, when we remember how vastly tartar varies in shade under altered conditions, and in respect of its age; yet a formidable theory has been based chiefly on this variability of colour, which ascribes a

“sanguinary” or “serous” origin to the nodular deposits that form beneath the margin of the gum.

Dr. Ingersol, an American dentist, discovered an “induration of granular formation” at the apex of a tooth that he had extracted, and he affirmed that he subsequently observed twenty such cases. Analysis showed dark colouring matter in these formations which, in his opinion, were only found in connection with ulceration, and this material he called “sanguinary calculus,” because he inferred that it could not have come from the saliva.

To establish his point it would be necessary to prove that these calcareous deposits were entirely inaccessible to saliva. It is an eloquent coincidence that the analysis only differed from salivary calculus in the presence of colouring matter, and, granting for the moment that this were effused as some form of hæmoglobin from the capillaries of the inflamed periosteum, it would not necessarily follow that the calcareous deposits came from the same source. None would be prepared to express surprise that an irritated periosteum should occasionally deposit on the root of a tooth small masses of calcareous material, similar in nature to callus or osteophytes. In the vast majority of instances the nodular deposit on the roots of teeth is plainly observed to progress in a direction from the cervix towards the apex, and not the reverse. It may here be mentioned that tartar has never been seen upon the surface of an unerupted tooth.

One other form of salivary calculus should be referred to, and that is the annular collection of hard dark material that is so often found beneath the free edge of the gum. Its formation and longevity are favoured by the protection of the margin of the gum, even in the mouths of many patients who give scrupulous attention to the use of the tooth-brush. Hard food and careful brushing may remove every vestige of tartar from the exposed portions of the teeth without being able to prevent the formation of a ring of calculus beneath the shelter of a gum margin that may have been congested from one of many causes.

In some cases of pyorrhœa alveolaris there has been no tartar whatever found on the roots of teeth extracted, but unfortunately this is not a final argument, for it may be legitimately urged that a thin layer of tartar might have been present originally, but was dissolved away by the vitiated secretions of the mouth, which had undergone a change in character and chemical reaction.

The presence of salivary calculus is insufficient in itself to account for a special disease with features of constitutional origin, and there is

ample reason for seeking the cause of pyorrhœa alveolaris in a systemic condition. It is known to occur in the mouths of patients whose health has been undermined by debilitating influences and injudicious habits of living. Frequently the disease is seen to attack the opposite sides of the mouth in a symmetrical manner. This is opposed to the assumption of a local origin of the affection. Cases have followed the prolonged use of mercury, iodide of potassium, or chloride of sodium, though it is open to doubt how far the blame should rest on the complaints for which these drugs were taken. Pyorrhœa alveolaris is a common sequel of malarial fever in America, and these patients are said to experience a great craving for salt.

Young patients recovering from eruptive fevers are sometimes subjects of pyorrhœa alveolaris. Frequent pregnancies are a ripe source of the disorder.

The recent researches of Mr Bland Sutton in Comparative Dental Pathology have supplied us with invaluable data. He established the fact that animals kept in captivity suffered from premature loss of teeth. Mr. Sutton collected numerous specimens of recession of the alveolar process, both when tartar was present and when it was not. At a meeting of the Pathological Society he showed a considerable series of the skulls of monkeys whose jaws were affected with recession of alveolus as a result of rachitis, and he recorded a similar condition occurring in a case of mollities ossium. During the time I was Dental Surgeon to Evelina Hospital, and since, I have seen many cases of premature loss of teeth from recession of alveolar process and gum in rachitic children. Mr. Bland Sutton showed that, in the case of lions kept in captivity, unsuitable food, by preventing the assimilation of lime salts, produced cleft palate in the progeny. Also, that a series of pregnancies at short intervals in the case of a female dog led to similar defects in the osseous system of the offspring by exhausting the maternal store of lime salts. Also, that in a snake kept in captivity the bone of attachment becomes absorbed, leading to the loss of the teeth, which were abnormal in size, number and attachment. The consideration of the above three facts in connection with one another offer a striking parallel to the hereditary form of pyorrhœa alveolaris, and suggest that an element of the complaint might be hereditary defects in the structure of the teeth and alveolar process.

Here one may cite the experience of all dentists that the removal of affected teeth usually cures the lesion where the teeth have stood, and

that the disease has a tendency to spread from affected teeth to those in their neighbourhood.

Attention has recently been drawn to *tabes dorsalis* in connection with the premature shedding of teeth. I recently examined two cases of advanced *tabes dorsalis* in the wards of Guy's Hospital. The disease was well marked, and neither patient had ever used a tooth-brush, but there was no evidence of *pyorrhœa alveolaris*. All wasting diseases and depressed conditions of the nervous system are conducive to the premature shedding of teeth, but *pyorrhœa alveolaris* is not a necessary concomitant of advanced *tabes dorsalis*. My friend Dr. Hale White is present to-night, and I leave this phase of the subject in his able hands.

Whilst a depressed condition of the constitutional strength is the most important factor in determining the diseased *pyorrhœa alveolaris*, local causes favour its development, and in patients of this systemic tendency the outset of the attack may be traceable to some slight influence, such as the use of a very hard tooth-brush, coarse tooth-powder, or the like. A crowded arrangement of the teeth may occasion it, or one tooth may be so placed that the mucous membrane around it escapes healthy friction and becomes the seat of the mischief. No doubt the subsequent deposit of tartar on the denuded portion of the root aids as a foreign body in keeping up the irritation of the periosteum.

One gathers from the somewhat diffuse literature of this subject a consensus of opinion that the early stage of *pyorrhœa alveolaris* is characterised by an hypertrophied condition of the muco-periosteal fold around the teeth, accompanied by dilatation of capillary loops, enlargement of papillæ, and rapid proliferation of epithelial cells. Later on the gum becomes firm and contracted, and displays increase of fibrous tissue. What changes go on in the socket during the recession of the alveolar margin I am unable to state, for the simple reason that I cannot get a recent specimen. The theory seems to be wide-spread that the inflamed periosteum becomes separated from the subjacent alveolar margin, thus depriving it of its vascular supply, and leaving it denuded, rough and carious. This may be so in some cases, but there are many in which the alveolar margin recedes and yet the result of probing is opposed to the supposition that the bone is bare. In these instances the socket wastes without becoming denuded of its periosteum.

At the Medical Congress in 1881, Dr. Walker opened a discussion on Riggs' disease and exhibited a number of microscopic specimens, the conclusions he arrived at being that in the present state of patho-

logical knowledge no distinction could be traced between the loss of a tooth socket prematurely by disease, its absorption after extraction or its wasting in old age, the microscopic characters being identical, viz. :—loss of vascularity, increase of fibrous tissue, subacute inflammation passing into the depths of the alveolar processes adjacent to the inflamed gum. The report does not mention to what extent this hypothesis was accepted, and the microscopic appearances described are unsatisfactory in this respect, that the section that would represent pyorrhœa alveolaris was taken from the mouth of an aged dog whose teeth were loosening.

The Museum of the Odontological Society possesses specimens presented by Mr. Bland Sutton of the skulls of animals which died in captivity, and whose jaws show evidence of a disease which seems to be an analogue of pyorrhœa alveolaris in the human subject. One of these, the skull of a carnivore, is very striking. There is not an even recession of the bone from the margin towards the apex, but the alveolus is obviously attacked to some distance from the margin. Where teeth have recently been lost, the surface of the bone shows depressions and hollows, irregular in outline, with eroded patches and a few spicules of bone that are apparently of new formation. Where the destructive process is at its full activity around a tooth that is being lost, a wide space is noticed to have formed between the tooth and the jaw, by absorption of the bone and the roots of the tooth. The space between the tooth and the jaw is as great at the apex of the root as at the neck. Around the affected tooth the alveolus is lost on the buccal surface, and wherever the root is laid bare it is coated with greenish-brown tartar, but the destructive process is seen to be going on in places where no tartar is present. There is a very peculiar appearance about the alveolar septum between the roots of the teeth, at those parts where it is thickest and most vascular. Here one can trace the outline of what its shape has been, but the bone has been reduced to a condition suggestive of filigree or trellis work, and the last support of the loosening tooth is obviously pedicles of alveolar process with efflorescent extremities of sponge-like bone. The cementum on the root of the teeth is thinned, and the root itself is greatly truncated by absorption. The general impression remaining is that one is examining a case of osteitis extending from the margin of the alveolar process to a point some little distance beyond the level of the roots of the teeth, and by no means going hand in hand with the deposit of tartar.

The result of local treatment aids us by demonstrating the very

refractory nature of well-marked cases. The thorough removal of any tartar from the roots of affected teeth by means of instruments and chemical reagents, and the subsequent use of astringents, gives good results, at least temporarily, by allowing the gum to more closely embrace the roots of the teeth, and preventing the accumulation of tartar and discharge in the alveolar pockets; but relapses are common, and our main attention must be directed to general constitutional treatment, which comes within the domain of the physician.

The inferences that follow from the points I have enumerated lead to the assumption that the affection which to-night we are calling pyorrhœa alveolaris is essentially of constitutional origin. In man and in lower animals it is found connected with wasting diseases and depressed conditions of the system. The local exciting cause may be of a very trivial nature.

The weight of evidence tends to place pyorrhœa alveolaris in the category of bone diseases. The exposed position of the alveolar margin and its intimate relation with organs of such feeble vascularity as the teeth, go far to explain why it is this portion of the alveolus that is first affected, and also the usual arrest of the disease by the removal of the teeth.

RECENT RESEARCHES ON SYMPTOMATIC ALVEOLAR ARTHRITIS.

By DR. E. MAGITOT.

Having referred to the history of and the literature on the disease, the writer says these lesions consist, in fact, of a derangement of an inflammatory nature, affecting at the same time the tissue which has been called the *alveolodental periosteum*, and the bony covering which is subjacent to it, viz., the cement. The term osteoperiostitis was thus justified by the simultaneous lesion of a periosteal and osseous layer. The expression conformed, moreover, to the rule adopted in France on the subject of medical nosology, which gives to every disease a name corresponding to the anatomical lesions which characterise it.

Be that as it may, this last description does not appear to have satisfied all authors, for several of them have gone back to the term *expulsive gingivitis*, which is evidently incorrect, since the gum is never primarily attacked. Others, again, have taken up the term *alveolar pyorrhœa*, which term seems to prevail amongst English practitioners, and particularly with our colleague, Mr. F. Newland Pedley; whilst others, Dr. David, of Paris, for example, propose to call it Fauchard's disease (*Maladie de Fauchard*), after the name of the author, who was

one of the first to mention it as described. Following the same idea it is called in England and America Riggs' disease.

If this tendency to multiply without any definite rule the names of the same disease be persevered in much longer, one calling it from one of its symptoms, *pyorrhœa* or *suppuration*, others giving to it the name of an author who has described it with more or less exactitude, extreme confusion will be the result.

Moreover, amongst this diversity of titles the rule, referred to above, of invariably taking as the basis of nomenclature the pathological anatomy of disease, is completely forgotten.

Thus, while regretting to add in our turn a new name to a nomenclature already so long, we feel ourselves, nevertheless, obliged to substitute once more for the designation hitherto employed a title which, faithfully conforming to the precise rules indicated, will establish the nature of the disease with all the exactitude desirable. This title is that of *Symptomatic Alveolar Arthritis*.

The justification of this choice is very simple. The recent researches made in France, particularly those by Mons. Malosse, have clearly established the fact that that which we have described as *periosteum* around the roots of the teeth ought to be considered, not as a membrane, distinct and capable of being dissected off, like the osseous periosteum, but rather as a true ligament.

This manner of looking at it, already indicated by Kölliker in Germany, and by Ranvier in France, in his course of lectures at the College of France, is generally adopted in our country. We, ourselves, are in complete harmony with it, thus accepting the necessity of modifying in our own studies the interpretation which we had, until now, assigned to this part of the dental organ.

The teeth are then in reality articulated with the jaws by the intermediary of a *ligament*, and every lesion of such an articulation ought to be assigned to the category of *arthritides*. We shall, then, henceforth thus describe the affection with which we are dealing.

As to the term *symptomatic*, we are induced to avail ourselves of it for the reason that this form of disease ought to be carefully distinguished from the affection hitherto described under the name of *alveolodental periostitis*, and to which henceforth the name *simple alveolar arthritis* will be most applicable. This latter, which is in fact sometimes spontaneous or traumatic, but more often the result of the last stages of caries, possesses a character and progress quite distinct from *symptomatic alveolar arthritis*. While the last commences at the neck of the root,

the former appears only at the apex. Moreover, the loosening and displacement of the teeth, the initial phenomena in the symptomatic form, are very rarely met with in the simple form. Finally, suppuration of the alveoli does not exist in the latter. Let us add that the word *symptomatic* well expresses the relation which this arthritis holds with regard to the general diseases or diatheses which are invariably the first cause of it. These different specific terms indicate clearly the differential signs of the two affections, which can thus preserve the generic denomination of arthritis, the term *symptomatic* sufficing, in our opinion, to distinguish that with which we are occupied in this work from that of *simple alveolar arthritis*, which name should remain attached to the ordinary form.

As we have already indicated in our previous researches, the causes of this disease should be looked for, not in the local conditions of the mouth or gums, but in certain conditions of the general health. The disease ordinarily attacks a single tooth ; occasionally several teeth may become involved, but in the latter case the affected teeth are not necessarily contiguous, they may occupy different positions in the mouth at a distance from each other. Toirac and M. Oudet believe they have observed that the inferior incisors were more particularly the seat. We have not ourselves recognised this peculiarity, which appears to us to belong more especially to gingivitis, which may in certain cases be confounded with symptomatic alveolar arthritis.

The teeth most frequently affected are in order of sequence : firstly, the molars, then the inferior incisors, the bicuspid, the superior incisors, and lastly the canines. We have never observed this disease affecting simultaneously the whole of the teeth. At one time it is situated on one or two inferior or superior incisors, at another the incisors are spared, and one or more molars are affected, ordinarily two or three on different sides of the mouth. Sometimes the disease only attacks a single root of these latter, or it may be only a single side of a root, a circumstance which preserves to the root a certain degree of solidity for a considerable time. The teeth affected with symptomatic alveolar arthritis do not generally present any preceding or accompanying alteration. Caries, for instance, has no connection with this disease, and if this complication is present it is simply an accidental occurrence. It is, indeed, worthy of remark that the local conditions which accompany the development of symptomatic alveolar arthritis appear to be just the opposite to those which accompany the production of caries ; the buccal saliva is in fact rather alkaline than acid, an accumulation of

tartar more or less abundant is observed in the places where it is usually met with. One might be tempted on the first glance to attribute to this deposit a part more or less active in the etiology of this disease, but it is not so. The deposit of tartar is a secondary matter, and in all cases, its formation being generally uniform and continuous in the same region, it cannot be cited in the production of an isolated and local affection.

It is very important to note the various conditions presented by those who are the subjects of symptomatic alveolar arthritis. The age at which this affection is generally observed is not either in youth or in advanced age, but between the thirtieth and fiftieth year of age ; it is equally frequent amongst men and women, and amongst the latter it appears often accompanied with the complex phenomena of the "menopause." In a certain number of cases symptomatic alveolar arthritis supervenes during a state of perfect health, and whatever pains we may take to find out the cause, we cannot recognise it either in the local conditions of the mouth, or in any appreciable disorder of the economy : nevertheless, the temperaments which appear predisposed to it are almost exclusively of the sanguine and bilious varieties ; constitutions appearing in other respects vigorous, yet subject to cephalic congestion. Persons of sedentary occupations, those who are engaged in an office, are particularly predisposed to it. We have already mentioned several times the relationship produced by the appearance of the crisis attending the cessation of the menstrual discharge, or of the hæmorrhoidal flux. This influence of temperament has again a close connection with heredity, which in certain families has appeared to us to influence the appearance of the disease ; thus it has made its appearance in members of the same family during two or three generations, and in analogous conditions of age and constitution.

Certain intestinal phenomena are observed, whether they be coincidences or whether of etiological connection. Habitual constipation is met with in the subjects attacked, and one of the physicians to the Paris hospitals, M. Fidal, has observed that they often present dyspeptic phenomena. Perhaps these latter may have been due to difficulties in mastication ; in any case, we have personally had the opportunity of verifying this assertion. Some general or diathetic conditions exercise a considerable effect on the production of this disease. Thus eruptive fevers have, as is known, sometimes caused a falling out of the teeth, a result produced by symptomatic alveolar arthritis.

We recently observed in a little girl seven and a-half years old

alveolar arthritis following a severe attack of whooping cough. The temporary teeth, and above all the permanent teeth already erupted, were surrounded by pads of inflamed gum, with alveolar suppuration and loosening of the teeth (one out of the first permanent molars had already fallen out, and another was greatly threatened). The affection appeared to consist in an ulcerative stomatitis and a simultaneous symptomatic alveolar arthritis.

Gouty and rheumatic subjects often present this kind of arthritis, as also do individuals attacked with anæmia caused by long illness; but there are no general lesions which exercise a graver influence on the production of this disease than those of albuminuria and, above all, diabetes. As regards the first we are dealing here, as is well understood, not with symptomatic albuminuria, but with what is properly called Bright's disease.

In glucosuria this phenomenon is absolutely constant, and even constitutes one of the primordial signs of the morbid conditions. In fact it is mostly found in the descriptions of authors that at the commencement of diabetes the teeth become loose and carious. This assertion concerning caries is not correct, but the first is perfectly so, and corresponds to the symptomatic alveolar arthritis which follows in its development the same course and the same progression as the general disease, causing at its termination the loss of a considerable number or the whole of the teeth. Such are the results of our researches, which we communicated to the Academy of Medicine, under the name of "A Treatise on the Value of Diagnosis in Saccharine Diabetes of Alveolodental Osteoperiostitis."

We have not recognised in any way that any other conditions of the health were in connection with symptomatic alveolar arthritis. Thus certain diathesis, such as syphilis, in which the tertiary symptoms affect the bones and fibrous tissues, do not appear to produce it; mercurialization and gingivitis, however great its severity, do not appear to become either the principal or even the occasional cause.

We do not wish here to enter fully into all the considerations concerning the treatment of symptomatic alveolar arthritis. We have detailed them to a considerable extent in our previous publications, but we should like to particularly insist on the value of the action of a certain class of remedies which enter into antiseptic medicine.

We are in fact confronted with a septic and contagious disease, of which the essential symptoms are an abundant alveolar suppuration, loosening and displacement of the teeth, recession of the gums—in a

word, all the conditions suitable to make of this lesion a spot favourable for the action of septic agents.

These agents undoubtedly exist in this disease. The microscopic preparations of pus proceeding from alveolar diseases have betrayed the existence of a large number of organisms of very diverse forms, amongst which it is, if the truth be spoken, still difficult to distinguish the variety which ought to be regarded as the essential and exclusive morbid agent of this disease. Further researches, we are convinced, will enable us to realise the culture of the pathogenic agent peculiar to symptomatic alveolar arthritis.

Some interesting experiments, undertaken by MM. Malassez and Galippe, for this purpose have already put beyond doubt the parasitic nature of this disease, and it is also confirmed by the frequent propagation of the disease from one alveolus to another in the same mouth, as well as by contagion from one individual to another, as observed by different authors and ourselves. All that we now wish to insist upon is the value of antiseptics in the treatment of this disease. With this view we would recommend such applications as alcohol, carbolic acid, perchloride of mercury, &c. For this purpose we have selected the following formulæ :—

No. 1. R	Hydr. perchlor...	...	...	...	...	50 c-g.
	Aq. Distil.	...	...	...	...	1,000 grms.
No. 2. R	Acid carbolic crystal	...	...	...	...	—
	Ether	...	...	...	...	aa 5 grms.
	Alcohol	...	...	...	...	10 "
No. 3. R	Acid borac.	...	...	...	...	10 grms.
	Aq. Distil.	...	...	...	...	500 "
	Alcohol	...	...	...	...	50 "

To these formulæ we could have very well added others by employing other antiseptics, such as the permanganates, salicylates, salicylic acid, &c. It will be necessary besides to have recourse to the employment of medicines which will modify the local condition, as well as to attend to the treatment of the general health, paying due regard to the diatheses which influence the disease.

Thus the treatment of symptomatic alveolar arthritis can be summed up in the three following paragraphs :—

1st. To render antiseptic the alveolus, the seat of the arthritis.

2nd. To modify the condition of the affected tissues by the application of astringents and caustics.

3rd. To treat the general conditions or diatheses which govern the local manifestations.

Concerning the second point—that is to say, the local treatment of the affected tissues—it is known that we have advocated applications of chromic acid, employed chemically pure and monohydrate, as a powerful caustic susceptible of acting on the vitality of the tissues of the gum, and, above all, on the dental ligament. Let us add that chromic acid may also be considered at least equal as an antiseptic to any of the drugs usually employed in that sense. We can mention again, among the modifying agents, pure carbolic acid, chloride of zinc, and lastly heat applied by means of the galvanic cautery.

Finally, as concerns the diatheses, the dominating influence of which we have already referred to, we shall not here indicate the treatment so as not to exceed the limits of this paper.

From the preceding considerations we believe we may deduce the following conclusions :—

1st. The affection characterised by alveolar suppuration, by the loosening and falling of the teeth, ought to be considered as a true symptomatic alveolar arthritis, septic and contagious, and which ought henceforth to remain known by that name in surgical nosography.

2nd. This affection is most often met with under the influence of certain general conditions and diatheses, and as secondary to eruptive fevers, &c., of which it may form either a complication or a sequela.

3rd. The therapeutics of symptomatic alveolar arthritis ought to consist essentially in the employment of antiseptics, of local alteratives, astringents, or caustics, without prejudice to the treatment of the general conditions which are its determining causes.

DISCUSSION.

The PRESIDENT remarked that the term “arthritis,” used by Dr. Magitot, would probably sound strange to most of those present, though it did not really mean anything very different from what they were accustomed to. It was based on the opinion, held by the author of the paper and others, that what was generally known in England as “the alveolodental membrane” was, properly speaking, a ligament, and that inflammation of it should not, therefore, be referred to as *periostitis*, but as *arthritis*. This view of the nature of the alveolodental membrane was founded, in part, on Comparative Anatomy.

Dr. HALE WHITE said he had been interested for some time past on the subject under discussion, having had his attention called to it by the premature loss of the teeth which occurred in cases of *tabes dorsalis*. He showed a tooth which had fallen from the mouth of a

patient affected with this disease. It was a lower molar ; there was a little tartar on it, but its loss had been unaccompanied by any signs of inflammation. This falling of the teeth was, according to some authors, a rare but genuine symptom of *tabes dorsalis*, and there were apparently two ways in which it could occur. The soft structures around the jaw might swell, and one by one the teeth might fall out, although themselves quite sound ; this might be followed by some necrosis of the jaw with discharge of a sequestrum. Or the teeth might fall out without any apparent cause, and the patient might lose a number of sound teeth within a few days without any pain or swelling of the gums. Richardieu has recorded one example of the first kind, whilst examples of the second had been recorded by Hoffman, Lewis, Vallin, Demange, Gowers and Féré. In many of the cases it was an early symptom, but still it was a rare one ; indeed, it was a question on which the dentist might be able to give the general physician some information, whether the teeth fell out more commonly in persons suffering from *tabes dorsalis* than in persons not so affected. He (Dr. White) was inclined to think that the teeth might fall out in many diseases, and that such an occurrence should not be exalted to the position of a symptom peculiar to *tabes dorsalis*.

Dr. White next referred to the atrophy of the lower jaw, described by Féré, as sometimes accompanying *tabes dorsalis*, and inquired whether dentists had met with such a condition of jaw. Disease of the tempero-maxillary articulation had also been described and regarded as significant of this disease, but it seemed probable that this also was only a coincidence, and that it was really caused by rheumatoid arthritis.

He should, further, be glad to know whether any examples of incoordination of the muscles of mastication had ever been observed by any of the members, and was the use of the "jaw-jerk" of any advantage ?

In trying to trace the cause and effect in these cases, it must be remembered that any wasting disease would affect the teeth also, whilst on the other hand any difficulty in mastication would lead to impaired nutrition.

Mr. J. BLAND SUTTON, in reply to an invitation from the President, said he had come to learn and not to speak. He could only endorse the views which Mr. Pedley had expressed in his paper. The disease was undoubtedly chiefly of constitutional origin, but it also required local treatment ; and as the physician did not consider that the teeth

were in his province, and the dentist thought the constitution was not in his, the treatment of this disease fell between two stools. He had examined a large number of cases of rheumatoid arthritis, and found that the premature loss of the teeth was a very common feature. It was also met with in mollities ossium and in other wasting diseases. As to tabes dorsalis, it was, he believed, only a name for a group of symptoms not connected with any definite pathology. It was, however, a curious fact that some of the carnivora got symptoms closely resembling those of the locomotor ataxy in the human subject, including the falling out of the teeth and absorption of the alveoli.

To arrive at a proper understanding of Riggs' disease it was necessary not only to look in the patient's mouth, but also to note carefully the constitutional state, and especially any indications of the presence of rheumatoid arthritis, and to obtain particulars of the patient's family history. It was only by the careful collection of facts that it could be ascertained whether Riggs' disease was really a disease, or whether the name was merely a convenient cloak for ignorance.

Mr. F. J. BENNETT said Mr. Pedley appeared to consider the vascular supply to the periosteum was derived principally from the vessels of the pulp and of the alveolus. But it was a fact which could be clearly seen from specimens in the Museum that there was a very free supply from the submucous tissue of the gum. The capillary network where the gum joined the neck of the tooth was very peculiar from the looped arrangement of its vessels, a description and illustration of which was given in Salter's "Dental Pathology," and in Tomes' "Dental Surgery" there was a figure of an injected specimen showing the vessels much enlarged in a monkey.

Tracing the course of the disease, it would be found that the first symptom was increased vascularity at the gingival margin and separation of the gum from the neck of the tooth; that there was a strong tendency for this part to become congested, and that this congestion was followed by effusion into the submucous tissue, causing gradual destruction of the fibrous attachment of the periosteum to the tooth.

The belief in the dependence of Riggs' disease upon tartar appeared to be still very general, but a strong argument against this was that cases were frequently met with in which persons had large accumulations of tartar which had been forming for years, but yet had not caused separation of the gum from the tooth. This, he thought, was quite sufficient to show that there was no necessary connection between the presence of tartar and Riggs' disease.

He agreed with Mr. Pedley that the disease was predisposed to by causes which brought about a lowered state of constitution, as anæmia, dysentery, frequent pregnancies, feeble circulation, &c.

Mr. S. J. HUTCHINSON said he wished to say a word in defence of the name by which the disease which was the subject of discussion had been generally known for some years past. He was quite aware that Dr. Riggs was not the first to recognise the disease, but that the symptoms were accurately described in the first edition of Tomes' "Dental Surgery." But Dr. Riggs was the first to point out that the removal of the free edge of the alveolus had the effect of checking to a considerable extent the progress of the disease. He had in fact pointed out the only method of treatment which had hitherto proved successful, and he (Mr. Hutchinson) thought that the connection of Dr. Riggs' name with the disease was not an undeserved compliment. It must be admitted that the profession was still in darkness as to the origin of this disease, and further investigations into its etiology and pathology were greatly needed.

Dr. WALKER said he should be pleased to present to the Society the sections (eighteen in number) which had been prepared for examination by the members of the International Medical Congress of 1881 by Dr. Gibbes, and to which Mr. Pedley had referred in the course of his paper. The members could then examine them at their leisure, and form their own opinions respecting them.

Mr. MOORE said it had been stated that evening that Riggs' disease never affected all the teeth. With reference to this point he would mention the case of a lady, aged thirty, whom he had treated for this disease about fifteen years ago. All her teeth were loose, and covered with hard nodular tartar from the crown to the apex of the root. Various remedial measures were tried, but proved useless, and eventually all her teeth had to be extracted.

The PRESIDENT said that some years ago, when on a visit to the States, he saw Dr. Riggs carry out his treatment in a good many cases. He did not remove the edge of the alveolus, for this was already gone before the cases came under treatment, but he gouged out and scraped away all the softened bone surrounding the affected teeth. His treatment was somewhat severe, but its *immediate* effects were certainly very good. In all the cases, however, which he (Mr. Tomes) had been able to trace out afterwards, the disease had recurred and ran its usual course.

The question with reference to the connection of tartar with the

disease, which had been referred to by several speakers during the discussion, received, he thought, some elucidation from a specimen in the Museum. On looking at this it would be seen that the ring of hard tartar surrounded the tooth at some distance from the edge of the alveolus, and that the surface of the tooth between these points was quite clean. It seemed evident from this that the tartar could not be the cause of the absorption of the bone.

With reference to what had been said about the premature loss of teeth by patients suffering from locomotor ataxy, he could only say that in two cases of this disease which had come under his notice the teeth were in a perfectly healthy state. In both cases the disease was at a comparatively early stage.

Mr. HERN said the majority of those who had taken part in the discussion appeared to agree in considering that Riggs' disease was of constitutional origin, and he thought hardly enough attention had been paid to its local causes. It appeared to him that a good deal might be said in opposition to the theory of its being a constitutional disease. In the first place many of those who suffered from pyorrhœa alveolaris were in what might be termed vulgar good health. Then it was not unusual to find a single tooth affected in the upper or lower jaw, and sometimes only a single root, as the palatine root of an upper molar, the other being healthy. The way in which the disease spread on either side of an infected centre was much more suggestive of a local than of a general origin. The effect of local remedies also served to strengthen this view, and the fact that the disease could not be checked, if not cured, by antiseptics. He thought that the difficulty in effecting a permanent cure arose from the fact that sufficient attention was not paid to the disease in its early stages.

Dr. FIELD said he could not elucidate the pathology of the disease, but he should be glad if he might be allowed to say a few words with regard to some practical points in connection with it. He would repeat what he had stated before the Society not long since, that cases of genuine Riggs' disease were comparatively rare, and he doubted if one had ever been cured. He knew that Dr. Riggs and others asserted that they had cured cases, but he himself had never yet seen a patient permanently cured. The disease was invariably connected with a depressed state of the nervous system. In several of the cases he had seen the patient was suffering from Bright's disease, and one was suffering from locomotor ataxy. Medical and dental treatment must go hand in hand. Locally he still used Dr. Riggs' instruments, carefully removing all

tartar and then applying aromatic sulphuric acid. The gums should at the same time be stimulated by rubbing and by massage with the fingers. By these means good results could be obtained for the time, and the progress of the disease checked, but he almost despaired of obtaining a permanent cure.

Dr. GEO. CUNNINGHAM thought that if Dr. Field would make further inquiries he might be induced to modify his opinions. It was Dr. Mills, of Brooklyn, who was chiefly instrumental in getting Dr. Riggs' name attached to the disease. He himself suffered from it, and was cured by Dr. Riggs. Dr. Riggs was a very modest man, and no reflections could be thrown upon him for the use which had been made of his name.

It was certainly very desirable that more exact knowledge should be obtained with reference to the pathology of this disease, and he would suggest that if dental students would examine the mouths of all the cases brought to the *post-mortem* room they would be sure to come upon examples of Riggs' disease, and might obtain sections which would be far more reliable than any which could be got from animals.

Mr. STORER BENNETT said he should like to call the attention of members to the fact that there were a number of very interesting specimens of premature absorption of the alveoli to be seen in the Museum, and he thought that if members would take the trouble to investigate them carefully, they might add a good deal to their knowledge of the subject.

Mr. PEDLEY, in reply, said he could not agree with Dr. Magitot in thinking that the disease was contagious. He had never heard of a dentist getting it from a patient, and as to its spreading to contagious teeth, it spread, not by contagion, but by continuity of tissue. As to the germ theory, this had been frequently suggested, but never proved. No doubt there was an abundance of germs present, but it could not be proved that any of these were specific. In the discussion which took place on this subject at the International Medical Congress of 1881, Dr. Arkovy announced that he had discovered and cultivated some organisms which he thought were peculiar to this disease, but these observations had never been confirmed, and Dr. Arkovy himself did not appear to have thrown any further light on the subject.

Dr. Magitot also denied that syphilis or mercurial treatment predisposed to pyorrhœa alveolaris. He (Mr. Pedley) could only say that this did not accord with his experience.

So far as his limited experience enabled him to judge, he thought

Dr. Hale White was right in concluding that there was no direct connection between Riggs' disease and tabes dorsalis. Certainly in the cases of this disease which he had examined at Guy's Hospital the gums were quite healthy.

He was not surprised to hear from Mr. Sutton that patients who suffered from osteo-arthritis were liable to suffer also from pyorrhœa alveolaris; it only confirmed his experience that it was a frequent complication of all chronic diseases resulting from constitutional debility.

Mr. F. J. Bennett supported the "catarrhal theory." Some cases of congested gum margin might be explained in the way he had suggested, but his theory certainly would not account for the course and symptoms of pyorrhœa alveolaris.

Dr. Walker had kindly offered to present his series of specimens to the Society. He (Mr. Pedley) readily admitted that several of these were valuable and instructive, but he objected to the sections taken from the jaw of an old dog which was losing its teeth being regarded as typical of Riggs' disease.

He could not quite understand the grounds on which Mr. Hutchinson advocated the retention of the name "Riggs' disease." He gathered that Mr. Hutchinson wished to retain it because it commemorated a method of treatment which was based on a theory which was now known to be incorrect, and which had itself proved unsatisfactory in practice.

He congratulated Dr. Field on having changed his opinions since 1877, and come round to what he believed to be a truer view of the case.

Dr. Cunningham had alluded to what he said was "a genuine case of Riggs' disease," but as there was no definition of Riggs' disease to be obtained, it was impossible to say exactly what was meant by "a genuine case." Dr. Riggs attributed the disease to the effects of tartar, and his treatment was intended to effect its removal. There was no doubt that the treatment did do good for a time, but only by the removal of *débris*, and to deal thus roughly with diseased bone, breaking and lacerating it with instruments, appeared to him on the face of it an unwise course to pursue.

Mr. Tomes had referred to a specimen in the Museum, which showed clearly that tartar was not to be found where the destruction of bone was going on most actively. He (Mr. Pedley) had alluded to this in his paper, and he had no doubt had the same specimen in mind.

Mr. Hern appeared to think that a ring of hard dark tartar was the distinguishing characteristic of Riggs' disease. What then would he call

the cases in which there was no tartar to be found, but which were identical in every other respect?

After the usual votes of thanks to the contributors of casual communications and the authors of the papers read during the evening, the Society adjourned.

ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

THE Annual General Meeting of the Society was held in Edinburgh, on March 11th, the PRESIDENT (Mr. W. Bowman Macleod, L.D.S.Edin.) in the chair.

The TREASURER (Mr. M. Macgregor) submitted his report, which showed an income of £49 9s. 10d., derived from subscriptions, entry money, and interest on bank account. This, with a balance carried forward from the previous year, and a deposit receipt of £95, gave a total of £146 10s. 10½d. After deduction of expenses, which included printing, rent of rooms, stationery, &c., a sum of £112 7s. 0½d. was left as representing the funds of the Society—an increase of £15 6s. over the corresponding amount of the previous year.

The CURATOR and LIBRARIAN (Mr. G. W. Watson), in tendering his report, said he had great pleasure in announcing that Mr. Robert Hepburn, of London, had very generously presented to the Museum the large collection which had been on loan from him for a considerable time past in the Society's Museum, and which included cases containing a series of mineral teeth, with the maker's name attached, from 1815 to 1863; also gum-work blocks of moulds for teeth, old-fashioned instruments, &c.

On the motion of the PRESIDENT, the meeting recorded its sense of gratitude to Mr. Hepburn for his handsome donation, especially as many of the objects included were unique, and there were many others, duplicates of which were only to be met with in similar Museums.

The following members were elected office-bearers for the forthcoming session, 1887-8:—*President*—W. H. Williamson, M.B., C.M., L.D.S.Edin., D.D.S. *Vice-Presidents*—Malcolm Macgregor, L.D.S.Edin.; J. Moore Lipscomb, L.D.S.Fng. *Hon. Treasurer*—G. W. Watson, L.D.S.Edin. *Curator and Librarian*—J. Stewart Durward, L.D.S.Edin. *Hon. Sec.*—John S. Amooore, L.D.S.Eng.

Councillors—James Mackintosh; W. Bowman Macleod, L.D.S.Edin.; Walter Campbell, L.D.S.Eng.; Rees Price, L.D.S.Eng.

Mr. ANDREW WILSON, L.D.S.Edin., read a paper, entitled—

THE PREMOLARS IN MAN.

The premolars in man are normally two pair in each jaw, and as they have two cusps, more or less decided, they are more frequently called bicuspid.

This latter name is, however, far from definite, as we occasionally, although rarely, have bicuspid central and lateral incisors, and also bicuspid canines, the extra cusp in these being due to an enormous development of the tubercle or prominence in the centre of the cingulum. The forms of the premolars in the upper jaw differ very considerably from those in the lower, and while in the latter the distinction between the first and second is decided, there is little comparatively between the two upper. There being, so far as I am aware, no description of the upper premolars in any of the dental or anatomical works in our language* sufficiently accurate as to enable one to distinguish even the teeth of the two sides, I will, with your permission, begin by endeavouring to give one, taking the first premolars as that best marked. As in all teeth having a grinding surface, we have in the human premolars five surfaces, namely: labial, lingual, mesial, distal, and grinding.

The labial surface is broadest between the mesial and distal angles of its grinding margin; it tapers somewhat abruptly towards the neck, and is convex longitudinally and still more so transversely. The length from the neck to the mesial angle is much less than that to the distal, and it tapers very abruptly from these angles to the apex of the labial cusp, which is placed decidedly to the *distal* side of the tooth, the slope from the apex to the mesial angle being thus much longer and greater than that to the distal angle.

A well-marked ridge passes upwards from the apex and merges in the general surface about half-way up; so leaving two lateral depressions, that toward the mesial angle being the larger and more pronounced; occasionally it is deeply grooved.

* A small work in German, "Anatomie des menschlichen Gebisses," by E. Mühlreiter, Leipzig, 1870, gives a very detailed and, judging by the engravings, extremely accurate description of the human teeth.

The lingual surface may be said to be composed wholly of the cusp and its base. It is shorter than the labial, but is much more convex, both longitudinally and transversely. It terminates in the lingual cusp, the apex of which lies *close to the mesial* side of the tooth.

The mesial surface is at its grinding margin nearly flat, but a little from that it becomes *concave*, the depression being greatest toward the labial margin and neck.

The distal surface is much larger than the mesial; is convex transversely and still more so longitudinally.

The grinding surface is irregularly quadrate, its labial and distal sides being greater than its lingual and mesial respectively. Its centre is occupied by a deep transverse depression, somewhat crescentic in form, the concavity being towards the labial side. From the apex of the labial cusp a well-marked ridge passes upward, ending abruptly in the depression, and occasionally a much fainter one passes from the lingual cusp.

The mesial and distal sides are bounded by a rounded ridge or parapet, continuous with the lingual cusp, that on the mesial side being usually broken by the transverse depression.

The peculiarly irregular form of the grinding surface is best seen if a pair be placed with their mesial sides in contact.

There may be either one, two (labial and lingual), or three (two labial, one lingual, as in the Simiadæ roots, two being the most frequent, three being comparatively rare. The divisions may occur at any part, and the divergence of the roots may be very decided.

When the root is single, both its mesial and distal surfaces are longitudinally grooved, that on the former being the deeper, and there is not unfrequently a slightly marked one on the labial surface.

The pulp cavity in the crown follows the contour of the tooth, having corona corresponding to the cusps. At the neck the canal is much compressed, especially in the middle, becoming so much so in the grooved root of single rooted teeth as to be practically two canals united by a mere fissure.

The description of the second differs in a few points. In it the labial and lingual surfaces are nearly equal, the former is less V-shaped, the depressions on each side of the labial ridge are almost obsolete, and the root is more frequently single.

Abnormal forms in these teeth seem rare. I have met with one case in which the first on both sides simulated the first lower, in that the lingual cusp was rudimentary, and was connected with the labial by a well-marked ridge, on each side of which was a slight depression. We have also cases in which the first is a geminated tooth (union with a conoid tooth on its mesial side), three of which I show. I have also met with one case in which a second has assumed the conoid form.*

The second is also very frequently smaller than the first, the difference in some cases being very marked. Both seem to be more liable than other teeth to become more or less rotated during eruption, the second being not unfrequently semi-rotated.

Of the lower premolars we have already very good descriptions; in them, as in all the other teeth (the upper premolars alone excepted), the most prominent point of the convexity of the labial surface is towards the mesial side, to which also the labial cusp points, and their lingual surface is much less convex than the labial, just the reverse of the uppers (this also applies to the molars).

They have almost always single roots, but we occasionally meet with some having two, which are labial and lingual, as in the upper (in the Simiadæ, where two is the normal number, they are mesial and distal, as in the molars). Abnormal forms seem rarer than even in the upper. I have met with the first, a geminated tooth (two firsts), and also cases in which firsts and seconds were very much flattened, the mesio-distal diameter being much the largest.

A form of the second, in which the lingual cusp is divided by a notch into two sub-equal cusps, is extremely common.

The extreme convexity longitudinally of the labial surface in the first (the cusp being almost over the centre of the tooth) is much more strongly marked in the anthropoid apes, and I think can be traced to the very peculiar form seen in the macaques and baboons, in which a large surface is opposed to the formidable upper canine.

The premolars present in man are usually given as representing the third and fourth of the typical placental mammalian dentition,

* Since writing this paper, I have met with another abnormal form. In it there are on the labial surface, besides the ordinary cusp, two others, one on each side, springing from about the middle of the surface.

but I am much more inclined to regard them as the second and third, for the following reasons :—

In those mammals in which we have the typical number, the first is usually more or less rudimentary in form, and almost, if not quite, invariably has had no deciduous predecessor. It is this tooth which I consider represented in man by the conoid portion of a geminated first.

In the few cases on record of a normally formed supernumerary premolar in the human dental arch, it is to the distal side of the normal second, and in the only case I have met with (lower jaw) that on the one side erupted after the extraction of the first molar, while that on the other side only did so after the removal of both the first and second molars. I am inclined to consider these rudimentary, and almost conoid teeth, which we not unfrequently meet with in the upper jaw, to the buccal side of the normal series. As supernumerary premolars (the fourth typical) we have them between the second premolar and second molar, between the first and second, and even between the second and third. They also occur as conoid teeth geminated with the first molar (on their buccal surface).

The tendency to dwarfing in the second, and its being occasionally conoid, also point to the same conclusion.

In the platyrrhine monkeys, where three premolars are normally present, the first differs in form from the other two, which are alike, and as they have three molars in their temporary dentition, I regard their successors, the premolars, as the second, third, and fourth of the typical dentition.

I may notice, in passing, that the teeth generally in these apes are much more human in form than those in the old world monkeys, the anthropoids excepted.

Those members who take a special interest in this subject will have remarked that I have made no reference to the extraordinary case recorded (with illustration) in the Association Journal for March, 1886, in which there are six premolars, all well formed, on the one side, the normal number being on the other. My reason for doing so is that there are so many points in which it is abnormal, and so little is known of its history, that I could not venture to draw any deductions from it.

As regards the number, it is just double of any other case I know of on record. Even when we include the lower mammals,

very few cases are recorded of five premolars on one side. Owen figures one in an Indian boar,* another is figured by De Blaineville in one of the long-muzzled canidæ,† and I exhibited another in an Australian dingo to this Society last session; but these are all in species in which four is the normal number, not two, as in man, and the supernumerary is only a duplicature of the first, the most rudimentary of the series, and having a temporary predecessor. In this case none are rudimentary.

As I have already remarked, unfortunately little is known of the history of the case: nothing in reference either to the number and position of the temporary molars or order of eruption of the premolars and first molar.

Supposing there was no excess of temporary molars and that their arrangement was normal, the germs of the two extra premolars, which are *in* the arch, must have been developed and in possession of the space belonging to the first permanent molar at a very early period—a state of matters which would most likely have involved their eruption in advance of the molar. Again, as there was no abnormality in the lower teeth, one would have liked to learn how these articulated with the upper.

The case is stated to have been complicated by cleft palate, but, judging from the illustration, one would hardly have thought so.

In conclusion, I will only add that I sincerely trust the time is now past when such a case, or any approaching it, will be allowed by any dental surgeon to lie unrecorded for years, as this one was.

DISCUSSION.

Dr. SMITH said that, not previously knowing the drift of Mr. Wilson's paper, he felt some difficulty in complying with the Chairman's request to open the discussion upon this abstruse and interesting subject. It was something new in the literature of dentistry, as in no work he knew of in the English language was there any such admirable description given of the anatomical peculiarities and distinctive characters of the premolars in man. A dissertation upon these teeth was beset with many difficulties. It would be recollected that only one of the four classes of teeth

* Odontography, Plate 141, Fig. 3.

† C. Tomes' Manual, 2nd ed., p. 386.

met with in the mammalia was really scientifically defined, and that was the incisors. Shape, number, size, and other matters, which were liable to vary and become grounds of dispute, were not maintained as the main definitions distinguishing the incisors, these teeth being always held to be simply the teeth contained in the intermaxillary bones. In man the bicuspid was described as the surviving representative of the premolar teeth figuring in the archetypal formula of the mammals. But, even in such formula, what precise characters constituted or were essential to a premolar tooth was a difficult matter to determine. They were not in every case the successors of the milk molars, as they were in man. They varied in size, and shape, and number, as well as in having predecessors, or having successors, and even in their presence, to a considerable extent, throughout the animal kingdom. Even the canine tooth itself—the first or anterior of those in the true maxilla—might sometimes be fairly classed among the premolars, as in those cases where all its typical characters were wanting, and were found in some other class of tooth, such as the incisor, and which occurred in various well known instances among the lower animals. These remarks had suggested themselves on hearing Mr. Wilson's interesting allusions to the variety in certain points of formation and number among these teeth when occurring in various animals, as relating to certain abnormalities in the number of these particular organs, and the multiplication of their fangs occasionally met with in the human subject. Wherever the full number or perfect development of these or other systemic parts throughout any class of animals departed from what appeared to be an established typical formula, it might, according to modern research, be assumed as in all probability due to the influence of what was known as diminished functional activity, or to what was called adaptive modification, leading to survival of the fittest—a natural law exemplified in the case of individual animals where certain structures, whose function had ceased, disappeared; such as in the ductus arteriosus, or thymus gland, after birth; in the atrophy of muscle from disuse; or of the optic nerve, where certain causes have led to blindness. These were all interesting and instructive points suggested by Mr. Wilson's valuable and exhaustive communication. The plaster models, also, which he had exhibited as illustrating his views, were excellent examples of that structural conformation in

special and differentiated teeth, such as those of the heterodonts, which had led to the hypothesis that they were derived merely from some fusion of the simpler forms of these organs, as met with in the homodonts. Altogether the paper was one which merited the warmest thanks of the Society.

Mr. WATSON described a lower right wisdom tooth of abnormal shape, which had been extracted at the hospital, with considerable difficulty, by one of the students. On the coronal portion of the inner margin of the posterior lingual root arose a somewhat longish oval protuberance, projecting backwards and slightly outwards—constricted at its attachment, but swelling out towards its extremity. It was covered by a thick and highly vascular membrane (enamel membrane), the whole being beneath the surface of the gum when the tooth was in position in the mouth. At the base of the protuberance, and somewhat between the normal roots, was situated a third small and somewhat flattened root. He had made a section through the abnormal portion, and used part of it for a micro preparation, from which was taken a photo-micrograph. On examination after section, the pulp chamber was found to have passed some distance into the protuberance, which, in fact, was analogous to the crown of the tooth. Of the general appearance of the tooth, the members would be able to judge from the remains of the tooth, and also from a model of the tooth in its entirety—and the nature of its histological structure could be better understood by reference to the photo-micrograph. The probable physiological explanation of this malformation was that the germ of a supernumerary tooth had been developed in close approximation to the third molar, with which it eventually coalesced, the small extra root properly belonging to the supernumerary, and the two teeth possessing pulp chambers in common.

Mr. Watson also called attention to the suitability of photo-micrographs for teaching purposes, owing to the great improvements in objectives within the last few years, with which most beautiful and satisfactory results could now be obtained. In one of the specimens exhibited—a full-length section of a lower first bicuspid, with an odontome upon the root—it was impossible a few years ago to get a lens to take in more than the crown of the tooth, but now it could be represented in its entirety.

Photo-micrographs of osteo-dentine, dentine of repair, &c., were also shown.

Mr. MACLEOD made a short communication on the subject of Cunningham's method of facing hard rubber plates with metal. He said the process has for its object the placing between the palatine surface of vulcanite dentures and the mucous membrane of the mouth a layer of gold, which, being a good conductor of heat, will reduce the tendency to inflammatory action which vulcanite is said to induce. Several attempts have previously been made to line the surface of plates by means of gold leaf, &c., but these have all proved failures, owing to the readiness with which the gold lining scaled from the plate, to say nothing of the difficulty of carving the leaf in a uniform and unbroken surface round isolated teeth and up to the margin of the finished plate. Cunningham's process has none of these defects. Whether it will reduce the liability to congestion or not, it presents an attractive and workmanlike finish, and a surface which is more readily kept clean, and on these two points deserves our present commendation, leaving the more debatable one of avoidance of inflammation to be determined by experience.

Mr. Macleod then illustrated the process on prepared models, and the finished work by specimens made by Mr. Cunningham and himself.

Mr. WILSON said that he could not see how any benefit could be derived from the heat-conducting property of the gold lining, as it was covered on its lingual surface by a thick layer of vulcanite, its only free surface being practically the edge exposed at the palatal margin. The metallic layer might possibly assist in the case being kept clean, but the whole affair had an unpleasant odour of humbug about it. Having had personal experience of a vulcanite surface, both coloured and uncoloured, in contact with the palate for fully five-and-twenty years, he had found no uneasiness which could be traced to its being a non-conductor of heat.

Dr. SMITH said he was not quite sure how the conducting power of a metal would be influenced by being coated on one side by vulcanite in a cavity such as the mouth, where the temperature was not always uniform. The metal might act as a conductor of heat in two ways—it might convey heat from the palate, but on taking hot food into the mouth it would act in the opposite manner. This the vulcanite coating might obviate. As for irritation being caused by vulcanite, it no doubt might occur in exceptional cases, but he had seen very similar irritation

occasioned by gold plates, and long ago by the old fashioned bone sets—in certain patients.

Mr. BROWNLIE said there can be no question about the improved appearance which Mr. Cunningham's process gives to vulcanite work—converting what is, in its best fitting form, an unpleasant-looking surface into a “thing of beauty.” In his humble opinion its merit ends there, however.

From the notices which have been given of this process, and the statements made in connection with it from time to time, it appears to have been devised to cure, and has been thought to cure, a condition with which every practitioner is more or less familiar, but which is not due to wearing vulcanite. He could recall as many cases of the like condition when gold was worn as when vulcanite was the base. Want of cleanliness explains much of it, but not all. In some cases they must look upon it as a condition peculiar to the individual, aggravated by continuous wear and a close fit.

(To be concluded.)

THE DENTAL MANUFACTURING COMPANY, LIMITED.

THE Annual General Meeting of the Shareholders of this Company was held on March 26th, Mr. DUNCAN D. HEPBURN, in the chair.

The CHAIRMAN, in proposing the adoption of the Report, said that he thought there was substantial ground for congratulation ; each year added to the prosperity of the Company. There had been a considerable increase in sales during the past year, the profit was larger, and enabled the Board to make reductions of 10 per cent. for depreciation of plant and other accounts, and to recommend a 6 per cent. dividend for the year ending December 31st.

The Chairman then referred to the issue of shares, which, he said, became necessary as the new teeth business developed. Their foreign as well as home trade showed signs of rapid increase ; and he believed the issue of the balance (about 340) of the original shares would enable them to meet all demands for some time to come. He was glad to state that, within a week of the Balance Sheet being issued, nearly 100 shares had been applied for.

Referring to the DENTAL RECORD, he said its circulation was gradually increasing, its articles were practical, and the fulness of

its reports of meetings was appreciated, the greatest care being exercised to prevent anything objectionable finding a place in its pages.

Dr. J. S. CRAPPER seconded the adoption of the Report. In the face of the competition for business which existed, he thought it was highly satisfactory for the Company to have had such a large increase in their business. Their Auditor, who was connected with many large companies, had assured him that few businesses had done better than theirs during the past year.

Dr. WORMALD said it had been his duty to support the adoption of the Report for several years, and he did so now with very great pleasure. He pointed out that the Company was now in a very different position to what it had been in years past; it had developed into a substantial business and was consolidated on a sound basis.

On being put to the meeting, the Report and Balance Sheet were unanimously adopted.

The retiring Directors, Dr. Wormald and Mr. Lawrence Read, were re-elected.

Votes of thanks to the Chairman, Directors, Manager and Employés concluded the business of the meeting.

Editorial.

THE PROGRESS OF THE PROFESSION.

IN the March number of the DENTAL RECORD (page 137) reference was made to the extra-mural relation of the L.D.S. of the Royal College of Surgeons of England. In further considering in what manner the status of the Dental Profession could be advanced, the educational aspect of the question may now be alluded to. Education has already done more for professional progress than any other single factor, and it is by education that the status of the Dental Profession must and will be further raised.

Among the requirements of the dental curriculum is attendance on lectures on Medicine, Materia Medica and Chemistry (three courses); but, strange to say, those subjects form no part of the examination. It has come within the present writer's experience, as a teacher for the past twelve

years, that candidates for the L.D.S.Eng. have, as a rule, little or no knowledge of those particular subjects. The excuse which is made by the student is that, as he is not examined in those subjects, he merely attends the several lectures in order to be "signed up," rather than to gain knowledge which, however useful, is not wanted for his examination at the College of Surgeons. The results are that so much of the time of the not too zealous student is, by the authority of the College, uselessly spent; there is an air of indifference excited in the lecture theatre which is too apt to distract, or be simulated by, the more industrious; and the curriculum, in reality, is not what it appears to be.

The College of Surgeons of England has, for the past twenty-seven years, required and sanctioned this "system of education," anomalous as it is. There can be no question that if candidates were examined upon all the subjects required to be taught, an advancement would thus be made in the education of the L.D.S.Eng. The present time seems opportune for such progress. In the new Charter which the College is seeking, one clause asks for power to appoint two additional examiners to the Dental Board. Hope may be entertained that the Board of Examiners in Dental Surgery, when augmented in the manner sought, will be sufficiently imbued with the significance of the shortcomings of their examination to make such amendments as will remove the anomalies here mentioned.

Another urgent requirement is, that the examination shall be divided into two parts. The first part to be an examination in Anatomy, Physiology, and Chemistry; the second to include Medicine, Surgery, Dental Materia Medica, Dental Anatomy, Dental Surgery, and Operative Dentistry including Mechanics. If such a scheme were adopted, a higher state of efficiency could be attained. And that there is need for candidates to be better grounded in the General subjects of curriculum is too well known to those who have had any experience with the ordinary run of students aspiring to, and obtaining, the L.D.S.Eng.

The foregoing lines of improvement in dental education rest with the College of Surgeons of England. The Dental

Board at the present time possesses members of the Dental Profession to whom the interests of the specialty are paramount. They have already done inestimable services, and they can be trusted to yet further the progress of the profession by removing the weak points in the education and examination of those whom they affirm to be "fit to practise the Science and Art of Dental Surgery."

GOSSIP.

THE Hæmatoscope is a small wedged-shaped glass cell, on which is etched a millimetre scale, by means of which the thickness of a layer of liquid at any point can be ascertained. The blood to be examined is placed without dilution in the cell, and the thickness of the layer which shows both the absorption bands of equal intensity is determined, and the percentage of oxyhæmaglobin is ascertained from special tables. With a direction vision spectroscope the first and second bands of the spectrum of blood under the thumb-nail can be seen. If the phalanx be ligatured, the bands gradually disappear. The time required for the disappearance is called the time of reduction. It varies from twenty to thirty seconds. The mean duration of a healthy person is sixty seconds. With blood containing 14 per cent. of oxyhæmaglobin the time of reduction is seventy-five seconds, from which it is calculated that 0.2 per cent. is reduced per second. This is taken as the unity of reduction. The activity of reduction in a healthy man is measured thus:—

$$\text{Activity of reduction} \propto \frac{\text{quantity of oxyhæmaglobin}}{\text{time of reduction}} \times 5.$$

Compt. rendu.

LEAVES of a plant have been sent to England by the Governor of Madras which have the property of destroying the taste of sweetness and bitterness. They are produced by an Asclepiad named *Gymnema sylvestre*. After chewing them sugar tastes as so much sand, and quinine loses its characteristic bitterness; they are said also to destroy the power of enjoying a cigar. The leaves have a bitterish, astringent and slightly acid taste. They do not appear to act by paralysing the gustatory nerves; inasmuch as when sugar is mixed with other condiments, as in gingerbread, the ginger is still detected, and while an orange loses its sweetness,

its acidity is appreciated in a concentrated form. How the leaves act upon the nerves of taste is not yet known; possibly a solution of the question may be found in the assumption that there is a differentiation in the fibres of the nerves of taste—the glosso-pharyngeal and the lingual—which respond to the stimuli of bitters, sweets and acids, and one or two other sapids; and the terminations of those fibres only are paralysed by the action of the *Gymnema* leaves, which respond to the first two. The effect lasts several hours. This property is supposed to be due to an organic body allied to chrysophanic acid, which can be extracted by ether and by alcohol, from which it is precipitated as a bulky grass green mass by acetate of lead. The leaves contain about 6 per cent. of this substance.

COAL tar colors are now used to beautify the wines we drink.

PROFESSOR SANDFORD says an ordinary snail can mount a plate of glass vertically drawing a weight of $2\frac{1}{4}$ ounces, while horizontally it can move 17 ounces. On a ceiling it can travel with 4 ounces suspended from its shell, and on a piece of common thread it can carry up another snail of equal weight to itself.

THE action of mercurial vapour on the leaves of living plants is first to increase their respiratory power, and after some time, to destroy the resisting power of the leaf to dessication.

THE expansive force produced by amalgamation is strikingly illustrated in the following experiment. A brass bar a foot long and three-quarters of an inch thick becomes rapidly curved when it is amalgamated along one edge, this edge becoming convex. On hammering the bar to straighten it, the curvature is increased. This fact, rightly regarded in connection with amalgam stoppings, may throw some light on the best method of making them.

PROFESSORS Ayrton and Perry think that the mercury amalgam used in polishing Japanese mirrors may assist in making the thin portions more convex than the thicker, and so explaining the mystery of the figures seen on their obverse.

THE way in which the nitrogen of the atmosphere is utilized by the vegetable kingdom has been, until lately, imperfectly

understood. According to Berthelot's latest researches, besides the ammonia and nitric acid which exist in the air and are absorbed by plants, either directly or through the soil, the latter is continually absorbing nitrogen from the air, even when it is not supporting vegetation. The amount so absorbed is far greater in soils exposed to rain than when they are protected, and in the majority of cases the nitrogen is converted into nitrates after absorption. Probably it will be found also that soils play an important part in absorbing carbonic acid from the air, instead of its removal being the work only of vegetable life. On such a supposition, there is no difficulty in understanding how the increased and increasing excess of carbonic acid eliminated from our great manufacturing centres and a thousand other sources, is kept in check in the absence of increased plant life, and the constant composition of atmospheric air maintained.

DURING the 300 hours that the sun pours his beams upon the surface of the moon the soil is heated to a temperature equal nearly to that of melting lead. This heat is radiated into space until the previously parched soil assumes a temperature approaching that of celestial space itself, which is estimated to be about 200 degrees below zero.

THE temperature produced by the escape of condensed carbonic dioxide is 168 degrees below zero.

DURING a hailstorm which passed over Reit Vlei, Cape Colony, hailstones fell in rapid succession as large as cricket balls, one measured 4 inches by $3\frac{3}{4}$, and several weighed $\frac{1}{2}$ to $\frac{3}{4}$ lbs. each.

A NEW theory of the formation of diamonds has been propounded by Professor Simenler, based upon the observation, that in these gems, cavities are often found which contain a gas, or a liquid, which has a less refractive power than water, with a greater expansive force. Simenler, finding these properties to coincide with those of liquid carbonic acid, supposes that carbon may be soluble in such a fluid, and that by slow evaporation it would crystallize and assume the form of the diamond. So also by proper evaporation of a solution of the black diamond, which is used for polishing, the colourless diamond might be produced.

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EXTRACTS FROM LECTURES ON OPERATIVE DENTAL SURGERY.

By WILLIAM ST. GEORGE ELLIOTT, M.D., D.D.S.

(Delivered at the National Dental College.)

(Continued from page 206.)

GOLD as a filling material has been used for a long time, but there is no evidence that it was used by the ancients; it has been stated that gold stoppings have been found in some of the Egyptian mummies, but more thorough examination has shown that what was taken for stoppings was the ornamental gilding of the lips, more or less common at that early period. We cannot go back, I think, beyond the latter half of the last century. It was mentioned by Fauchard, 1785, and was in common use about 1800. The first American record we have is of some work done in London by a Mr. Waite about 1815, although it is quite possible that Woofendale first introduced it into America about 1795.

Gold, as used for stopping teeth, is not the commercial article classed as pure, and worth some £4 per ounce, but as made by different manufacturers, is not only of great purity, but of marked ductility.

Anyone who has done much in alloying gold for dentures, solder, &c., knows how easily this ductility is removed; a mere fraction of 1 per cent. of arsenic, or lead, is quite destructive to this necessary characteristic—indeed the copper and silver ordinarily used to alloy with, must be of great purity, or at least, must contain as little as possible of the objectionable materials. We require in gold great purity, not as some seem to think that it may be cohesive, nor on account of the ductility, as gold may be alloyed largely with some metals without materially injuring this property or destroying its cohesive character, but to withstand the

secretions of the mouth; the purest gold will discolour in some mouths, not necessarily in those badly cared for, as it is sometimes noticed where the greatest care is taken, but in those mouths where there seems to be a development of *aqua regia*, as I have invariably noticed that when discolouration does exist, it is apparently the purple of Cassius (a double salt of gold and tin).

Gold, as used in the arts, is not only comparatively impure, as it contains more or less alloy, but it is beaten out much thinner than we use it. 200,000 sheets are required to make an inch in thickness.

While practising in Japan, I was in the habit of procuring some gold from China, made by the natives; it was apparently pure, and as ductile as that furnished by the depôts, but I could not get it thinner than No. 60 or 80. As thick foil, it seemed to answer every requirement.

The Portuguese coins called *Johanns*, on account of their purity, were formerly used by the profession; at that time, early in the century, every dentist made his own gold, by rolling down these coins to a thickness of No. 10 or 20, and it was not until 1835, as far as I can ascertain, that the manufacture of gold for dental purposes was regularly taken up, Abbey, of Philadelphia, having commenced at that time.

In 1840, Dr. Westcott, of New York, called attention to a peculiar property of gold foil, it sometimes becoming sticky and thus objectionable. This property was subsequently utilized by Dr. Arthur, of Baltimore, in 1855. Before this, however, in 1853, Dr. Watt, of New York, and Mr. Joseph Barling, of Maidstone, Kent, brought out about the same time a new form of gold. It was then, and still is, called sponge gold, as well as crystal gold, &c.; it is made by precipitating from a solution of the chloride of gold the pure metal, by the assistance of electricity. It resembles a piece of exceedingly fine sponge, and is usually prepared for the cavity by tearing portions from the mass of the necessary size, annealing them, and forcing them into position, either with serrated hand instruments or mallet pluggers. I have long since abandoned the primitive mode of preparing it referred to, instead of which I use a rotary knife of one inch in diameter, and driven by the dental engine; it is best used at a high speed, 3,000 revolutions per minute, and will cut the gold into any sized blocks required without the least condensing it.

After many years' use of foil, I gradually took up sponge gold, and now use it exclusively. No. 1 and 2 of Watts' I find best suited to my requirements; the advantages, I think, it possesses over foil are: it is more plastic, and lends itself more fully to the necessary packing against the walls of the cavity; unlike foil, it does not ball up under the plugger, nor block the way to undercuts, &c. It is more readily attached to the walls of the tooth, and is consequently not so easily displaced; it requires less retaining points and undercuts, it produces a hard surface by malleting, and retains a burnish much longer than foil. As a possible objection, I think it may not be quite as strong as foil for bridging from one point to another.

Soft foil, or that form of gold that came first into use, was employed as a filling material, just as paper would be used for the same purpose; the general principle recognized being that each piece or pellet should go from the bottom to the top of the cavity, like, in fact, cigars in a case.

As originally used, the small pellets or sections of rope were forced by hand pressure against the walls of the cavity, other pieces were added and packed laterally, until the cavity was fairly well filled; then a pointed or wedge-shaped instrument was forced into the mass, and the hole enlarged by lateral motion. Other pieces were added, as far as possible, until no more could be introduced; the projecting mass was now condensed by plugger and burnisher, and finished off.

Subsequently, foil, folded in the form of tape, was used in the same way, while, still later, this tape was wound round a bit of wire or five-sided broach into a cylinder. These were made of uniform length for each cavity, but varied in thickness. Cylinders were generally used with a foot-shaped instrument, and were condensed from the distal end of the cavity forward.

Since the introduction of the mallet about 1868, they are frequently consolidated by this means, and when the cavity is completely filled, they are malleted on the surface.

The cylinders, as originally made by hand, were small and hard, being wound tightly around the wire.

They are now usually made light and soft, as by many operators they are also used, after annealing, in cohesive work. The use of the hard cylinders has been largely discontinued, although they have some advantages over the others.

It requires more skill to use non-cohesive foil than the cohesive, and as there is some elasticity in a stopping made of this material, it preserves the tooth better; that is, a soft foil operator will be more successful in the class of cavities he will undertake, than one who only works with cohesive gold.

The class of cavities suitable for this gold must have four walls, more or less, while, of course, cohesive gold can be put almost anywhere that anchorage can be secured.

I hope, gentlemen, you will all be eclectic in your practice; use soft foil when you can do so, for generally you can make a successful operation in half the time you can with cohesive.

Of course, you will aim to become expert operators with both kinds, and you must also not forget the virtues of amalgam and oxyphosphates.

To return again to cohesive foil. Dr. Jack, by the use of retaining pits, was enabled to overcome some of the difficulties first experienced in the use of this material, and it rapidly became popular, introducing the era of contour fillings (which have done much to advance our profession, but which, like other good things, may have been carried too far), I should think that not half the cases are worth the labour, pain, and money spent on them, particularly now that we have something so much better in gold crowns.

The union of surfaces in cohesive foil, although sufficient, is at best but partial, at least as shown in the plug. We often hear of stoppings being taken out of a tooth or experimental matrix, and rolled out into a sheet as proof of their solidity (it is the rolling out which solidifies them); the force applied in the mouth is not sufficient, nor are the instruments adapted to such a result. They should have ovoid smooth points ordinarily like the goldbeater's hammer face, and the force applied at right angles to the surface of the filling; consequently such instruments and the force necessary, are inadmissible in the mouth.

We have to use serrations to prevent our pluggers from slipping, and the serrations do not leave the gold in the best condition for the union of surfaces.

I am in the habit of using occasionally for flat work, like in erosions, a flat square-edged, smooth instrument, and where the cavity is accessible and square with the instrument, one with an ovoid face, because it is only with a surface of this kind that you can expect to spread the gold and thoroughly condense it.

Now, while it is not necessary to get perfect union between the pieces of gold in order to save teeth and retain a fair surface, do not for a moment undervalue condensation; nothing will condemn your work as much as lack of solidity, no feature is as important. A thoroughly solidified plug is retained much more firmly by the tooth, and will require more force to dislodge it, less undercuts are necessary, there is less give, to produce loosening; in every respect, for the work, if not for the patient's feelings, solidity is a most desirable quality. Do not, gentlemen, fall into the error which led me astray for some years. Do not think that surface malleting will take the place of homogeneous solidity. I first learned this fact by noticing in old fillings that those portions which had a hard foundation, as the edge of the enamel, &c., kept the best surface. Your stopping must be solid at the start, or it will loosen, and must be solid all through. Now, to get this desirable quality, time is necessary. Fine gold cohesive work generally means slow work; for this reason, the mechanical mallet is so valuable, and next to it I place self malleting. One can strike for oneself twice as quickly as an assistant can for one; and then by having the assistant feed the gold, much time is saved.

For years I used the electric mallet, but have given it up, as it is too slow. I experimented a good deal to perfect it, succeeded in increasing the force of the blow without increasing the magnetic force, increased the polarizing surface of the carbons with increased E.M.F.; introduced a new circular switch, which gave me control of all and each cell, and a new magnetic dynameter, and kept records for months of the E.M.F. and Amps of each cell taken every few days, collecting data for future use, but I was then gradually taking up crystal gold, and found the mallet not suitable, using instead a heavy eight ounce hammer.

You will probably have noticed that burnishing destroys cohesion. Why, I cannot tell you; sometimes it will; at other times it will not. It is this refusal of the pieces to unite that prevents us burnishing in the gold at times; even the experience we have derived from the Herbst process, 1883, has not given us the required knowledge. In using rotation in condensing gold, sometimes the layers are rendered quite non-cohesive; at other times they are irregularly so, and sometimes quite cohesive. We are told by the inventor that when a layer is found to be non-

cohesive it should be again burnished over by the engine point, and it will become cohesive. I cannot say that I have found it so, although my experience with this process is not very extensive. As it was found that minute portions of gold became attached to the rotating point at first, recourse was had to polishing with fine emery cloth, but latterly the points are made with agate blood-stone, or some equally hard material. I have used aluminium bronze points for the process, but I do not know that it possesses advantages over steel. In the Herbst process, enough gold, either large soft cylinders (Wolrab's), or any soft make of gold (personally I prefer crystal), is taken to quite fill the cavity. This can be either burnished in with any point which will enable you to reach all parts of the cavity, or first cover the gold with a piece of cotton wool or Japanese paper, and burnish on that.

The latter process leaves the gold in a more even and better adapted condition, but also leaves it quite non-cohesive.

The cavity can then be scraped with a sharp excavator until cohesion is restored, or a new layer can be attached if desired, by the aid of sharp serrations.

Cohesion may not be necessary if there are still walls to the cavity unfilled, or if you can get sufficient undercut for the new layer. Layer after layer is added until the cavity is quite filled. The process can never be fully accepted, I think, for many reasons: it is not more rapid than self-malleting, less so perhaps than the engine mallet; the process is unmechanical, and has no tendency to inspire the operator with confidence,—in fact, there is an element of uncertainty as to durability that is not encouraging.

A PROFESSIONAL HOLIDAY.

By GEORGE CUNNINGHAM, B.A.Cantab., D.M.D.Harv., L.D.S.Eng.

(Continued from page 213.)

THE German Minister of Education, after consultation and with the approval of the University Board, decided that it was just as necessary to have a school for the teaching of dental surgery as for that of any other medical specialty; and accordingly, in November, 1884, the Dental Institute of the Royal University of Berlin was founded. The Dental Institute is not in itself a complete teaching school, but forms a part of the complete

teaching scheme of the University; hence the student studies dentistry not as a student of the Dental Institute, but as a student of the University of Berlin. It is necessary, therefore, that students wishing to study dentistry should matriculate at the Berlin or some other German State University. No special matriculation examination is held by the Universities as in our country, but the evidence of the student's preliminary education in Arts, as we would call it, is assured by his having to produce a certificate from the State schools, which shows that he has passed either the final examination of a German High School (Gymnasium), or that of a first-class "Realschule." Another class of students, termed "immaturi," are admitted on production of a certificate of having performed his one year's military service as a volunteer, or the certificate of efficiency for the "prima" or highest class of a German Gymnasium, or a first-class Realschule. The curriculum of the Realschule differs from that of the Gymnasium by the substitution of modern languages and science for the more advanced classical courses of the latter. There are certain other details with regard to matriculation which are to be found in a paper by Professor Busch, in the *Deutsche Medicinische Wochenschrift*. It is not without interest, however, to note that as women are not permitted to matriculate in this University, they cannot therefore obtain admission to the University Dental Institute.

In order to contrast the education evidenced by these certificates with that of our own preliminary examination, I have made certain inquiries, the results of which, though not altogether satisfactory, yet enable us to gauge pretty well the distinction between the two. From the possession of a certificate of efficiency for the "prima," it may be taken for granted that the holder has a considerable knowledge of the classics; in Latin, that he is familiar with such authors as Livy, Cicero and Virgil; and in Greek, with Homer, Plato and Xenophon; that he has a good knowledge of German, of History, of Arithmetic, of Geometry, and some elementary knowledge of the French language. If, however, he holds the certificate of a Realschule, it may be inferred that his knowledge of the classics is confined to Latin, and that he does not know any Greek, but that he will have such a knowledge of the English language that he is able to read an author such as Macaulay, and that he has a better knowledge of French than the holder of the "prima" certificate of the Gymnasium.

Physicians and Dentists, who have already passed their State examination, are admitted to the University on providing themselves with *Hospitantenkarte*—that is, a card admitting to lectures as a visitor, and not as a student. When physicians in practice wish to undergo the dental examination, they are not required to make any new matriculation, and are examined in dentistry only, the anatomical and surgical part of the examination being excused.

Admission to the State dental examination is regulated in the German States by a public notice of the 25th of September, 1869, by which the candidate is obliged to produce evidence of (1) efficiency for the “*prima*” of a *Gymnasium* or a first-class *Realschule*; (2) two years’ university study; (3) practical exercise in mechanical dentistry. Foreigners are required to furnish evidence of a preliminary education equivalent to the “*prima*,” and to spend four semesters at some recognised German university in the study of dentistry. These requirements have been adopted since 1870 throughout the whole German Empire. A certificate of mechanical dentistry may be given by any qualified dentist in Germany if the student has been working in his laboratory for a long time; no definite period is required.

Those whose previous education is insufficient have little chance of obtaining admission to the dental examination, because it is extremely difficult to procure a dispensation from the State Government. At no time has the State dental examination been open without a curriculum to those who had been in practice, but previous to 1871 a dispensation of the certificates of preliminary education depended very much upon the goodwill of certain influential officials, especially in the minor States.

In the University the dental student may attend whatever lectures he pleases, the optional nature of a student’s course of study being one of the features of the German Higher State schools, and therefore he is not required to produce certificates of attendance upon any stipulated course beyond that of the mechanical laboratory already referred to. Dental students are, however, recommended to attend the courses of lectures on anatomy, physiology, physics, chemistry, *materia medica*, general pathology and the surgical clinic during one semester. He is supposed to dissect for a period of twelve weeks, during which time he is not allowed to operate in the Dental Institute, and

also to attend a practical course of microscopy. Because of that freedom of choice of each student, it is impossible to state the expense of the course of study, but whoever follows the course of lectures seriously and subscribes for all the lectures will have to pay in the four semesters from £30 to £40. I understand that it is not absolutely essential that the dental course should be taken in the dental department of a University, and that it is only necessary to produce the certificate of having pursued his studies with a fully qualified dentist, and of having studied for four semesters in some German University.

I am authoritatively informed that the present conditions exacted in Berlin are stricter than the law of 1869 demands. Three semesters at least must now be spent in the study of dentistry or of subjects bearing directly upon it.

Professor Hollaender, in the dental department of the University of Halle, over which he presides, and which it was my great regret not to be able to visit, requires an attendance on lectures in anatomy, diseases of the teeth, operative dentistry, and the surgery of the face, and three semesters' practical work in operative dentistry in the dental clinic.

There is a dental examining board at almost every university, consisting of three examiners, usually the professor of pathological anatomy, the professor of surgery or materia medica, and a practical State-qualified dentist; where there is a private docent or a professor of dental surgery, he is the third and, most probably, the principal examiner. In Berlin, the board consists at present of four examiners; Professor Waldeyer (Anatomy), Professor Busch (Oral Surgery), Professor Miller (Operative Dentistry), and Dr. Baume (Mechanical Dentistry).

The examination is divided into four parts (stations). In the first part (station), the candidate is required to describe in the clinic one or two cases of disease of the teeth or of the mouth, and is examined orally for thirty minutes on the same; he is then obliged to make a written description of the case and its treatment. The second part of the examination is somewhat peculiar; the candidate has to answer in writing ten questions, which he draws by lot out of a series of 150. These 150 questions are said to cover the whole field of Anatomy, Physiology, Pathology, Dental Surgery, some parts of General Surgery, and Materia Medica. He is not limited as to time in answering these questions, and in some cases

the examination has lasted from 9 a.m. to 11 p.m. In the third part of the examination he is required to make one or more fillings in the mouth, a set of teeth or a regulating case, according to the option of the examiner, and to perform several difficult extractions, no limit of time being fixed. In the fourth part (Schlusstation) he is examined orally by all the three examiners* for about an hour on anatomy, physiology, surgery, general pathology, and sometimes on general chemistry, and also on pathology of the teeth. The whole examination usually lasts about ten days, and the fee for the whole is 60 marks (£3).

An official register of those passing the State dental examination is kept at the Ministry of Education, but is not published. The total number of graduates in each year only is published. The number of those who passed the several State examinations in Germany during the academic year 1885-1886 was:—Medical practitioners, 998; dental practitioners, 50; veterinary surgeons, 126; apothecaries, 444.

Nothing is done by the State to compel medical men practising dentistry to hold the dental diploma, but if he wishes to pass the dental examination he can do so, and is excused the second part, the fee being reduced to 45 marks.

There is no association like the British Dental Association in Germany to exercise a political function, though, of course, there are associations where the qualification is that of the State diploma in dentistry or medicine. The medical practitioners practising dentistry do not appear to have any special organization, as in Austria. It is not uninteresting, therefore, to note that the provision for the study and practice of dentistry, especially in connection with the universities, is far ahead of that in Austria.

As the right to practise dentistry was either free or the law very loosely applied until about 1873 or 1874, a good many unqualified practitioners had commenced practice on their own account. As they were forbidden by law to call themselves Zahnärzte (dentists), the title reserved for the State-qualified practitioner, they very ingeniously invented the title of Zahntechniker or Zahnkünstler, equivalent to our term mechanical dentist. I am credibly informed that they are for the most part a most illiterate set, resorting to advertising dodges of the most disreputable nature. Many of them, however, are extremely clever and

* In Berlin the professors of operating and of mechanical dentistry alternate.

upright men; and it is not only a pity, as a distinguished university professor said, but even a national loss that they cannot be admitted to a qualifying preliminary examination in arts, and so be enabled to enter a university with a view to passing the State dental examination.

Some of their journals are extremely well conducted, despite their contention that they alone understand the mechanical part of dentistry, and the proceedings of their associations are not without interest. From the excellent display made by the school of the Berlin Association of the *Zahntechniker* at the Congress, I deeply regret not having an opportunity to make an examination of their school for myself, as I am not altogether prepared to accept the assertion so frequently made by the State-qualified dentists that the school only exists to blind the uninitiated. At any rate, the fact of such an institution being allowed to make an exhibit in the museum of such a Congress, with a special dental section "manned" by the principal State dentists, and officered by the director of the Berlin University Dental Institute, is surely a mark of great breadth of mind and true liberality of feeling. The truth of this statement seems to me justified by the general comments of approval of its excellence which I heard, even from the lips of a professor of the State institution.

The greatest possible jealousy exists between the *Zahnärzte* and the *Zahnkünstler*. With regard to advertising, it is to be regretted that there is no clear differentiation between what constitutes reputable and what disreputable practice, as in our own country, thanks to the moderate and wise provision of the British Dental Association in that respect; for, in Germany, too often the *Zahnärzte* emulate only too successfully the advertising feats of the *Zahntechniker*. In the reception room of some of the first dentists on the Continent is to be found a prominent display of artificial dentures of various forms. In this respect the English and American dentists set them a good example by eschewing such a custom, no matter how time honoured.

In the general and special hospitals in Germany there is no dental surgeon attached to the staff. At some of the universities there is, however, a separate dental clinic which is supported by the State—for example, at Berlin, Leipzig and Halle. At Breslau there is a dental clinic, but the State has nothing to do with it, as it is the private establishment belonging

to the Lecturer on Dental Surgery at the University. There is also a Lecturer on Dental Surgery attached to the University of Kiel.

With regard to the status, a lecturer does not rank as a member of the university, whereas a private docent does. In Berlin, only the Director of the Dental Institute ranks as an extraordinary university professor; the other professors are professors of the Dental School. At Halle and at Leipzig, Professors Hollaender and Hesse rank as university professors.

The Berlin Dental Institute is located in a large and commodious house belonging to the State, and specially altered for the purposes of the University dental clinic, to which it is exclusively devoted. The first floor is appropriated to the department for advice and extractions, and consists of a large waiting room; two extraction rooms, both well fitted with the necessary appliances, and one of them being specially devoted to anæsthetics; a large lecture room, containing a special anatomical collection; and the director's private room; with other conveniences for the accommodation of the students. The whole of the second floor is reserved for operations in conservative dental surgery. The rooms are large and lofty, with high windows affording an excellent light, and, according to our notions of hospital equipment, almost sumptuously furnished. There are twenty-seven operating chairs, all of the Wilkerson or the improved S. S. W. patterns, with a movable bracket and spittoon to each chair, while there are facilities for washing the hands in the immediate neighbourhood of each chair. An important feature of the equipment is the provision of six dental engines for the use of those students who have not already provided themselves with one of their own. Two large glazed cases serve for the reception of the most recent forms of instruments and filling materials, which are at the disposal of the professors and their assistants. Separate lockers are also provided, in which the student may keep his own instruments.

Unfortunately, at present, there is not sufficient room for the technical mechanical work of the laboratory being carried on in the same building; suitable provision, however, is made in a laboratory, at the house of the professor of mechanical dentistry. This is fitted with all the necessary appliances for gold, bone and vulcanite work, and can accommodate twenty students comfortably.

The staff of the Institute consists of the director, Professor Busch, and two professors of operative dentistry, and one of mechanical dentistry, and a salaried assistant to each of the departments.

Professor Busch, with the help of an assistant, superintends the extracting department, or the dental policlinic, as they call it, held daily from eleven to one. The extractions are executed by the students, after advice and instruction from the professor. All operations under anæsthetics are executed by Professor Busch himself. I cannot help thinking that in a teaching institution this latter arrangement is not as it should be.

The number of patients visiting the policlinic amounts to about 10,000 in a year, with, on an average, about 500 narcoses.

Lectures are of two sorts, the publicum or gratis, and the privatim, for which a fee has to be paid. The course on general surgery, the colloquium, and the lectures of Professors Paetsch and Sauer belonging to the former category.

Professor Busch delivers three lectures per week during the session on dental anatomy, human and comparative, and also on diseases of the teeth and mouth. Professor Busch, whose specialty was surgery before the foundation of the Institute, also delivers a weekly lecture on general surgery, attended both by medical and dental students.

Professor Miller lectures twice a week on operative dentistry. In the summer he devotes himself specially to theoretical and in the winter session to practical operative dentistry. Not the least interesting part of this course is the dental colloquium, which is conducted on the same plan as the physiological and other conferences held at Harvard University. The students select a subject for discussion at the next colloquium, when two of their number volunteer a short exposition of the question, after which follows usually an animated debate, which is superintended and controlled by Professor Miller. Professor Paetsch also delivers a weekly lecture on conservative dental surgery.

The practical course of operative dentistry is carried out under the joint supervision of Professors Miller and Paetsch, aided by Dr. Göttinger. The department is open daily from one to five. During the winter of 1885-6, 640 patients were treated (Operations: 562 gold fillings, 84 tin and gold, and 335 plastic fillings). Very little amalgam is used, and the major part of the

work is executed with cohesive gold. If the student prefers to employ the Herbst method of gold filling, he is allowed to do so. By a happy chance, Professor Miller devotes himself chiefly to the use of cohesive foil, while Professor Paetsch works for the most part with non-cohesive gold.

During the long vacation, a special course is held both in the policlinic and in the operative department, lasting about five weeks. It is attended by senior students, as well as by practising physicians and dentists.

Professor Sauer lectures twice a week on the theory of mechanical dentistry, including the necessary operations in the preparation of the mouth. Not the least interesting feature of this course must be the visits of the professor and his students to the workshops of the various industries in which materials and processes similar to those employed in the dental laboratory are in use, such as visits to foundries, modellers, goldsmiths and workers in ivory and other materials. Practical exercise cases are made in the laboratory under the superintendence of the professor, and when the student shows sufficient aptitude he is promoted to making and fitting practical cases in the mouth of the patient. During the winter session of 1885-86, 1,770 artificial teeth were used, 806 in exercise plates, and 964 in plates for practical use. The total amount of work done included the following :— 16 entire upper and lower dentures ; 13 entire upper dentures ; 50 partial cases ; 4 pivot teeth ; 2 splints for fracture of lower jaw ; 1 splint for fracture of upper jaw ; 6 regulating splints, and 12 repairs. The majority of these cases were made in vulcanite, while about twenty were made in metal, aluminium bronze being used as a substitute for gold.

The fees paid by each student per semester is as follows :—50 marks for the operative department ; 50 marks for the extracting department, and 120 marks for the mechanical department. The lectures are extra, those of Professor Busch and Professor Miller 30 marks and 15 marks respectively. The materials, drugs, rubber dams, &c., are supplied by the Institute. The student provides his own instruments, and Professor Miller has devised an excellent student's set, fitted in the neatest instrument case I have yet seen—in fact I was so struck with it that I immediately ordered one for my own use.

The State grant for the year 1885-86 to the University of

Berlin for the purposes of the Dental Institute amounted to 33,100 marks (£1,655). Of that sum, however, quite two-thirds was a charge to capital for establishment of the clinic, building alterations, furniture, instruments, &c., and an annual charge of about £589 for the payment of the salaries of two professors, two assistants and a janitor. The subvention to the school by the State is not limited to any particular sum, and all fees received from the patients must be accounted for to the Ministry.

The emoluments of the professors of operative dentistry are 2,000 marks (£100) per annum; in addition, Professor Miller's fees for his lectures amount to about 1,200 marks (£60) per semester. Considering the amount of time and energy this professor gives to his duties, it cannot be said that the State is over-generous in the remuneration of his services.

Every sufferer, rich or poor, will be treated if he presents himself at the Institute, and the patient pays, not according to his means, but according to a tariff of fees. All assistance, however, which does not entail any cost for material is rendered gratuitously, such as extraction without an anæsthetic. The following tariff shows the operations into which the cost of material enters:—Extractions under nitrous oxide, 3 marks; extractions under chloroform, 3 marks (2 to 6); gold fillings, 2 to 8, or even 10 marks; tin and gold fillings, 2 to 3 marks; amalgam and plastic fillings, 0.5 to 2 marks. For a large number of fillings and the complete restoration of the whole mouth, a special modified fee is usually settled before hand by the operating surgeon in charge. For artificial dentures and regulating appliances, the director of the technical department arranges the fee according to the material employed, and informs the patient of the amount before the appliance is made.

The number of students is now about 150, which is a remarkable increase from the somewhere about forty with which the Institute commenced in 1884, and shows clearly how great a public need it thereby meets. I have since heard that a number of students had to be refused admission this last year, simply owing to lack of room in the operative department. The success of the Berlin University Dental Institute is evidently beyond dispute.

THE TYPES OF TEETH IN DISEASE.

(A paper read before the Students' Society of the National Dental College.)

By JAMES F. RYMER, M.R.C.S.

THERE are three reasons why I thought this subject would be worth bringing forward:

Firstly, Our text-books and journals do not contain a large amount of information, and what there is is scattered over a period of 40 years ; and that by collecting these fragments together they might constitute a homogeneous whole bearing upon the question.

Secondly, As undoubtedly the teeth are affected by many diseases, it appeared to me that if we took the trouble to examine more thoroughly the forms and defects of the teeth, it might in some ill-marked disease prove most useful, by giving to the diagnostician another valuable symptom.

Thirdly, As many of our younger members have not yet attended the Medical and Surgical Wards at a General Hospital, and so have not had opportunities of studying the commoner diseases, such as gout, syphilis, &c., I thought by knowing what kind of teeth to expect in those everyday complaints, and which are seen in many of the patients who come to this Hospital, they would become more thoroughly acquainted with their peculiarities, and so, to a great extent, be able to spot gout, syphilis, rickets, struma, &c. I do not intend to (nor could I if I wished) enter at all deeply into the subject ; but in the endeavour to point out some special features of the teeth, which we ought all to be able to recognise, I have been obliged to put in two or three queries, hoping that some of our more experienced and learned members will be able to fill them in for me. With these remarks, I commence with

GOUTY TEETH.

Before describing these teeth, I will hand round a model of a well-marked gouty case. This patient had tophi of the ears, reedy nails, and a good gouty history. It may be interesting to mention that Dr. Graves first called attention to the ground down condition of the teeth as long back as 1836 in the *Dublin Medical Journal*, and there explained that the grinding is due to an irritable condition of the dental nerves. All of us, I think, will agree that this does not explain the cause. Again, Dr. Horatio Donkin, in the *British Medical Journal* for February 21st, 1880, points out the following case of a family:—The father suffered much with gout ; the mother's

ancestors were full of gout. This couple had eight children; all of them had their teeth much worn down, and, Dr. Donkin remarks, when asleep the grinding produced an impressive non-harmonious concert. In the Norse type the teeth are, as a rule, solid, blunt, and thick at the edge, due to the wearing down; dark in centre, due in many cases to a formation of dirty secondary dentine; the incisors are more worn than the canines or molars. Gouty teeth have a tendency to work out without caries, from an osteitis extending from the neck along and towards the end of the root. The gums are often retracted, and the mouth offensive, the latter being due to gouty dyspepsia. According to Dr. Milner Fothergill, there is often a well-marked osteal growth along the fang of the canine. A question now arises, What is the cause of this wearing away of tooth substance? Is it some malformation in the enamel and dentine? Or is it due to simple attrition, the result of some reflex irritation, as dyspepsia, &c.? It seems most probable that it is a combination of the two, for many people grind their teeth (as children with worms, &c.), yet their teeth do not wear down to the extent found in gouty subjects. Out of a large number of "gouty mouths" that I have examined at "Guy's," without exaggeration 80 per cent. either had gout or come from a gouty family.

Before leaving the subject of gouty teeth, I would like to mention rather a novel, at the same time an interesting case. A female patient, aged 30, came to the hospital one Friday, about a month ago, complaining of intense pain (not of a shooting character) in the right upper lateral tooth. Her teeth were distinctly gouty; I examined the tooth carefully, as did also the dental surgeon for the day, but we failed to find any caries or crack. It then occurred to me that it was a manifestation of gout confined to this tooth. I applied (by direction) a strong counter-irritant, chloride of zinc, around the gum and upon the tooth. I saw her a week after, when she said that all pain had disappeared in 24 hours after the application. I may add that the laterals were worn away considerably less than the centrals, and certainly there was no sign of sensitive dentine or pulp exposure. Was this a case of gout? If not, what was it?

STRUMOUS TYPE OF TEETH.

Scrofulous or strumous people often present signs of imperfect nutrition and development, their teeth being large and of chalky appearance, and often have milk-white spots on the surface, and

mostly upon the buccal surface. These indicate defective development of the enamel, with less gelatine than normal, and so the enamel is more easily acted upon by exposure to acid secretions, or to other external irritants. As these patients frequently suffer from "strumous dyspepsia," it is in those faulty spots that caries usually commences. The patient from which I obtained this model was of very strumous appearance, and although the teeth are not large, the model shows a typical case of strumous caries. The jaws are generally large in proportion to the teeth, and so crowding and irregularity is avoided.

PHTHISICAL TYPE OF TEETH.

Here the teeth are small and irregular, the palate is long, the central incisors lean towards each other, producing the "rabbit jaw;" or the teeth may be set at an obtuse angle, forming the "horse jaw." The teeth are very prone to caries, most commonly the upper incisors, especially the laterals (by some this is considered the test tooth for hereditary phthisis). Decay begins at puberty and at the sides; and so differs from strumous teeth both in size and site of decay. Corfe says that decay is due to the imperfect flow of blood in the vessels of the teeth (!).

RICKETY TEETH.

Although there is nothing peculiar in the type of these teeth, yet there is something quite characteristic which I have not yet seen mentioned in our medical or dental books. It is as follows:—The temporary teeth are erupted in the normal manner, but at about $2\frac{1}{2}$ to 3 years of age they loosen without any visible inflammation of the gums and drop clean out, the roots presenting no signs of any absorption. Through the kindness of Mr. Charters Symonds, of "Guy's," I had the opportunity of examining quite twenty-four cases of children suffering from rickets. It was quite an exception to find all the teeth present; in some cases both the upper and lower incisors had loosened and dropped out. This rough model was taken from a squealing baby, æt. $2\frac{1}{2}$.

The mother came to the hospital and asked me the reason of the teeth coming out. I examined the patient's tibiae and found well-marked curves, the lower ends of the radii and ulnæ were enlarged, the anterior fontanelle was also large; and naturally I told the mother that rickets was the cause. She then told me that a year previously the child had been treated at the Middlesex Hospital for rickets. The permanent teeth are often, erupted later than usual and

the centrals frequently have two small notches showing lines of development. They are either carious when erupted, or else decay shortly afterwards ; hence it is important to recognise rickets by the temporary teeth, for then the parents can be told what condition the permanent will very probably be in. Rickets is most common in the extreme poor or in the later members of large families.

STOMATITIC TYPE.

Under this head one has to jumble together divers diseases, such as scarlet fever, measles, convulsions, jaundice, &c., which all seem to produce the same defects in the teeth. The temporary teeth, although unaffected, are often erupted later than usual ; but greater interest lies in the permanent teeth, for during the period of the illness there is an arrest in the development of the enamel, and the dentine is seen to be a dirty brown colour. Thus, if a child is ill during the first year, and then recovers, the tip and half the lower surface of the central incisor teeth is devoid of enamel ; and if at a year and a-half, there will be a ring of exposed dentine near the cervical margin.

MERCURIAL TEETH

are closely allied to the above. Many people are dubious whether it is possible to distinguish a mercurial tooth from one due to stomatitis, but there seems to be one or two points characteristic ; generally it is the lower portion of the enamel that is defective, differing from the stomatitic tooth, which may be faulty at any portion of the crown. The surface is seamed and jagged, yellow and irregular in form ; the dentine frequently has rings of enamel on its surface, giving it a pitted appearance. In order to distinguish between a congenital and an acquired mercurial tooth, the tip or cutting edge is a sure guide (before the age of 20), for in the former the cutting edge is always devoid of enamel, whilst in the latter the enamel in this situation is often perfect for a distance of one or two lines.

As to the cause. Is this condition due to a simple stomatitis ? Or is the pitting, &c., due to the removal of the forming enamel by the absorbing power of the mercury ? Certainly many infants have convulsions entirely apart from dental irritation or the popular term "cutting the teeth," for convulsions in infants are due to a variety of causes, as diarrhœa, colds, &c., but still ignorant mothers blame the poor teeth and administer *ad lib.* "Stedman's Teething Powders" and other quack remedies, with the result that the previously healthy

developing enamel is in some way affected by the mercury, either by absorption or by setting up a stomatitis. The six-year-old molars are the test teeth for mercury.

SYPHILITIC TEETH,

or commonly known as "Hutchinson's Teeth," are now to be mentioned. Although by far the most important, they are the most easy to recognise, and are tolerably familiar to us all ; therefore only a few words about them will suffice. A very interesting discussion about them will be found in *The Lancet*, vol. i., 1876, which took place before a dental society, where the discoverer, Mr. Jonathan Hutchinson, boldly defended his pet teeth, in opposition to the opinion expressed by members of the dental profession, who contended that this peculiar form of tooth was independent of syphilis, and when people were known to have been born with the disease, it was a mere fluke if their teeth were altered in form. Happily, now the discoverer has convinced all that syphilitic teeth are always a reliable guide. The chief points are : notching of the two centrals, which are always symmetrical ; if the notching is not confined to the centrals, then the cause is most likely to be mercury, &c. The teeth are small, of dirty grey colour, and narrower at the cutting edge than at the neck. Again, on some of the teeth, other than the upper centrals, are to be seen several grooves along the surface, giving rise to the so-called "serrated teeth ;" or there is a central projection, "pegtop teeth." The grooves and other characteristic peculiarities begin to get worn down by the age of 20 ; hence they are far more difficult to diagnose with certainty after that age. The temporary teeth are never affected, but are normal. Why ? For the specific inflammation does *not* take place in utero, but calcification does.

There is yet one more rare form of tooth. I allude to "Mercurio-Syphilitic." It is only a cross between the mercurial and syphilitic types ; by knowing these, it is easy to recognise. I had the luck to see a good example of this type of tooth at this hospital about a year ago.

I have just recently had the opportunity of examining a somewhat unique mouth, exhibiting very clearly three distinct forms of teeth—viz., syphilitic, mercurial and rachetic. The patient, a girl æt. 10, was brought to the National Dental Hospital from the "Home for Waifs and Strays." Unfortunately, as no person appeared to claim the child, no history could possibly be obtained.

The patient had only one upper permanent incisor which was peg-shaped, but had a rough irregular cutting edge; the lower incisors were present, but so malformed as to appear as simple rough brown projections through the gums. I may add that the child had a large square head and face, the latter being of a decidedly "earthy" appearance; the elbow joints were much enlarged, evidently due to some early diseased action, and the child was very short in stature. These and other conditions pointed to congenital syphilis.

Now, in favour of mercury: The four six-year-old molars presented the typical mercurial appearance which I have elsewhere spoken about. In favour of rickets: All the deciduous set of teeth had disappeared, leaving the gums smooth and healthy, as pointed out in describing rickety teeth. In addition to this the upper jaw was small, due to arrested development; the lower jaw, although appearing larger, was of normal size. This disproportion between the size of the jaws has also a rickety significance.

Lastly, I may add that the recently erupted permanent bicuspidis were normal in number and of healthy appearance.

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THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE usual Monthly Meeting of the above Society was held at 40, Leicester Square, on the 2nd of May, the PRESIDENT (Mr. C. S. Tomes, F.R.S.) in the chair.

Dr. W. ST. GEORGE ELLIOTT exhibited and explained the working of a Hot Air Motor, which he said was intended to fill a

position in dentistry which had not hitherto been filled—*i.e.*, a motor of low first cost, which would give sufficient power for ordinary dental purposes, and which would be comparatively silent. The consumption of gas was only six feet per hour, and for ordinary purposes he considered it better than the "Otto" gas engine. He took the opportunity also of referring to another subject, that of the approaching Medical Congress in America, and read letters in connection with it from Dr. Taft, the President, and Dr. Bogue, the Secretary of the Dental Section. The Secretary said he was anxious that there should be a fair representation for this country, and he had written some three or four hundred letters, the majority of which had not been replied to, but he had succeeded in getting promises of half-a-dozen papers. Amongst those who had promised were Mr. Walter Campbell, Dundee; Mr. W. Bowman Macleod, Edinburgh; Mr. Edward Latchmore, London; Dr. George Cunningham, Cambridge; and Mr. S. J. Hutchinson. Dr. Elliott also mentioned another matter which he thought would be much more interesting to the members—*viz.*, the recognition of foreign diplomas. Dr. Taft wrote that he did not quite understand how, after nine years' operation of the law, a passage so plain as section 9 had escaped the attention of the authorities; had it not been the intention of the authorities to put some other construction upon it? Did not section 10 of the Dentists' Act virtually concede to the General Council the right to regulate the status of those holding diplomas? He did not wish to be considered as criticising the law, but merely as expressing his own opinion. He should be glad if in some respects reciprocity could be established, and would be happy to bring the subject forward at the meeting of the Congress.

Dr. WALKER showed a pair of interesting models received from Mr. John Humphreys, of Birmingham, who said they were models of the mouth of a patient who represented himself as only 22 years of age. The appearance of the teeth were such as Mr. Humphreys had not seen in his practice, and he thought it a case of erosion, but Dr. Walker was inclined to think it attrition. The dentine was reported to be exceedingly hard; six of the teeth were carious, but the rest were sound. The pulps were thoroughly calcified. The patient had no pain, and appeared to be in good health. Dr. Walker also showed other models from Mr. Humphreys, saying that he did so with great pleasure, as it was their only

means of testifying their appreciation of the interest taken in the Society by country members.

Mr. E. LLOYD WILLIAMS showed, on behalf of Mr. T. W. F. Rowney, of Derby, the inventor, a Hot Air Syringe, which he believed had, to a great extent, overcome the difficulty hitherto experienced of getting a current of air neither too hot nor too cold. The current of air was introduced by a small foot blower and heated with a Bunsen burner. The heat could be nicely regulated and retained for four or five minutes—sufficient for ordinary dental purposes.

Mr. C. J. BOYD WALLIS showed a model of an abnormally developed central in a boy aged 11.

Dr. G. CUNNINGHAM (Cambridge) then read a lengthy paper on "The Physiological Action of Cocaine," in the course of which he said that for some time past he had been endeavouring to investigate the subject scientifically as well as clinically. With regard to the results of local application, there could be no doubt that the drug had obtained for itself a place in dental *materia medica*, though it had failed to realise all the expectations of the profession. The very favourable representations of Messrs. Brunton, Hunt and others, as to the results of application by injection, must be accepted with caution. Investigation showed that cold-blooded animals were more susceptible to its action than warm-blooded animals. Several experiments had been made, showing the local action on the frog. As far back as 1879, Von Anrep—who had not received all the credit he deserved for his investigations—made some most satisfactory experiments. Two tracings were exhibited which showed the action of cocaine on the heart, the result being that at first the pulsations became slower and more forcible, then slower and more feeble, until complete arrest in diastole supervened.

Two experiments on the frog relative to blood circulation were made; the first, by injection, showed no contraction of the vessels, as it should have done, according to Von Anrep; in the second, immediate contraction followed local application.

With regard to respiration, small doses increased, large doses decreased the number; and it was interesting to note that the peculiar effect upon the respiration of the frog was in some cases precisely similar to that shown in many observations on man.

Small doses increased and large doses decreased the reflex

action. The irritability of the sensory fibres is heightened, and that of the motor fibres is unaffected by small doses. The sensory filaments are almost completely paralysed, but not the motor filaments, though diminished in irritability, by large doses.

He then went on to give some interesting figures as to the relative susceptibility of various animals under doses proportionate to their weight.

In the dog intense symptoms were produced by strong doses; dejection, want of sleep, &c., marked the final stages. The action of cocaine seemed especially directed upon the nervous system.

In warm-blooded animals, death occurred by paralysis of respiration.

Medium doses caused strong accelerations of the pulse; large doses brought about slowing of the pulse. Blood pressure was increased by small and decreased by large doses. With regard to dilatation of the pupil, in warm-blooded animals mydriasis after injection was observed. In experiments in man, the salivary secretion was noticed to be arrested in most cases, either by paralysis of the secretory nerves as by stropin, or by its known power of constriction of the blood-vessels.

In one case of several cocaine injections two periods were to be noticed by the patient, five to eight minutes of failing sight, dizziness, &c.; then a great mental clearness, interest in the proceedings, absence of fear and freedom from pain. The pulse did not return to normal until three hours after injection.

Dr. Cunningham then fully described the effects of two administrations of 1 grain on a dental practitioner, aged 25, strong, muscular, well-developed, and in excellent health. Toxic effects were very marked indeed, and lasted for some hours; the facial expression at once changed, in five minutes acute pain had ceased, in eight minutes a feeling of weakness showed itself—traceable to the heart. The patient complained of a very dry mouth, apparently due to the arrest of the salivary secretion. Loquacity was considerable, and during the loquacious period it was evident that the articulatory organs were unable to keep pace with the ideas; the loquacious period passed off, but the staring expression continued. After being under the influence of the drug twenty-four minutes he became drowsy, but this state was succeeded by one of great personal confidence. After three hours he could only walk home with assistance.

A distinct effect upon the sexual organs has been observed in several cases.

Dr. Cunningham, continuing, compared and contrasted a number of tabulated cases, one of the general conclusions from which was that the nervousness of the patient was no indication whatever as to the probable effect of the drug. Von Anrep was of opinion that carnivorous animals were more susceptible than herbivorous, but a young man of vegetarian habits all his life showed no lesser degree of susceptibility; no constant relation exists between dose and effect. Doses of $\frac{1}{2}$ grain may cause serious systemic effects.

Superimposed doses of $\frac{1}{2}$ grain presented some very curious results; in one the pulse was increased to 124 in twenty-four minutes from 112 in ten, while in another the second dose caused no further increase. It seemed that the addition of 2 per cent. carbolic acid did not materially alter the effect of cocaine.

In extractions pain was felt, but not to a great extent; the drug gave the patient fortitude and resolution in some cases, while in others it was an absolute failure. For extirpation of the pulp it was successful in one case, while in three others it failed to relieve the pain or it was impossible to operate.

In summing up the result of his experiments and observations, Dr. Cunningham said that, in cases of severe pain from acute periostitis, injection relieved the general pain, but as a rule not sufficiently to relieve the periosteum from pain on pressure. The subjective phenomena observed were light-headedness, giddiness, faintness in all degrees, precordial uneasiness, tingling sensations, and irritation of the skin. The objective phenomena include the characteristic respiratory change, irregular spontaneous muscular contractions sometimes amounting to convulsions, partial loss of power, and lack of co-ordination of muscular movements, cessation of salivary secretion, dilatation of the pupil. Out of nineteen patients there were only six in which there were no objective phenomena observed. In one case very severe toxic effects lasted considerably more than two and a half hours, giving rise to grave apprehension. The after effects were slight and inappreciable.

As to the sensibility of the part, the nerve supply of the teeth, being deep situated, was not easily affected by superficial injections under the mucous membrane. The cerebral stimulation is a more important factor than the mere local effect, therefore

administration by injection in small doses ($\frac{1}{2}$ grain or less) was preferable. Finally, as an anæsthetic for the painless extraction of teeth, Dr. Cunningham was of opinion that it was not to be compared with nitrous oxide gas, either for efficiency, safety, or certainty of action.

Mr. HERN read a paper on "Cocaine and its Use as a Local Anæsthetic in Dental Surgery."

The paper was a long one, and consisted, in a great measure, of a careful collection of the expressed opinions of the best authorities on the subject, both English and American, derived from various sources, but largely from the *Dental Cosmos*, *Dental Record*, and other dental journals. These Mr. Hern contrasted and compared, remarking at the outset that the time had arrived when it seemed desirable to sift and weigh the results of experiments, and to form a judgment on the various and frequently antagonistic opinions, but it would be well, in considering them, to bear in mind—

1. The sensitiveness of the drug to chemical action ;
2. The varying degrees of action of the several preparations of the drug ;
3. The different result to be expected from the same preparation when differently applied therapeutically ;
4. The difference in time to produce anæsthetic effects, and the vascularity or non-vascularity of the tissues to which it is applied ;
5. The different susceptibility of the patients ;
6. The difficulty of eliminating errors in its use.

Cocaine, for practical purposes, remained undiscovered until 1884. Since then it had been found to have a very pronounced effect on the mucous membrane. The anæsthesia produced by it was transient and superficial. The hydrochlorate was recognised as one of the most powerful salts.

In the adjustment of clamps and wedges, in removing tartar, modelling sensitive and irritable mucous membrane, lancing and excising gum tissue, &c., it was a valuable acquisition. For the relief of pain after extraction it could not be relied upon, the obtunding effect being so transient as to make it unsatisfactory. The same must be said of its use in odontalgia.

Dr. Morgan How, in the *Dental Cosmos*, 1884, found that it manifested the same anæsthetic effects as just mentioned. Dr. Ives, in the same journal, stated the successes and failures to be

about equal. Mr. Boyd Wallis recorded seven cases in the *Dental Record*, 1885, in which he tried cocaine; of these three were for sensitive dentine—he was using 25 to 50 per cent. solutions—one was useless, with two there was a little pain, and in three cases the operations were successful, there being no pain.

Dr. Woodward, of New York, gave as the result of his experience—in one case slight difference, in all the rest no difference. Dr. Raymond, in *Dental Cosmos*, 1885, reported all failures, thirty trials with thirty patients, and no diminution of pain.

With regard to the citrate, it was slow and inconstant in action; in some cases it caused considerable pain, in others it had no effect whatever. Mr. C. Spence Bate recorded ten cases of trial with this preparation—four of the cases were remarkably successful, in five the pain was slightly reduced but not entirely removed; nearly all the patients were young. Mr. Cormack, of Edinburgh, used the citrate with entire success; only one failure, and that with moisture. Mr. Hern's own experiments with the weaker aqueous solutions of the hydrochlorate were unsatisfactory, but, in conjunction with carbolic acid, better results were obtained.

As an agent for the reduction of pain in sensitive dentine the drug was unsatisfactory and unreliable. As an anæsthetic agent for exposed pulps the evidence was conflicting. Dr. Hepburn, of New York, stated in the *Independent Practitioner*, 1885, that after dropping in a 4 per cent. solution for five minutes he was able to remove pulp without pain. Mr. Arthur Underwood, in the "Society's Transactions," stated that 20 per cent. aqueous solution produced scarcely as much effect as carbolic acid. Mr. Truman, St. Thomas's Hospital, reported that with a 25 per cent. solution of hydrochlorate in spirit he removed the pulp from a molar in a boy without much pain. With aqueous solutions, as well as with pure crystals, Mr. Hern had obtained no success, and a review of the results quoted led him to the conclusion that the hydrochlorate in low solutions was powerless.

It was by its action, hypodermically injected, that cocaine had gained its name. Almost immediately after injection insensibility was produced around the puncture, and in a few minutes a small area of insensibility is produced which passes off in 20 or 30 minutes.

In looking up the subject he had found the record of two rather peculiar operations. One was mentioned in the *British Medical Journal*, 1886—the resection of the head of the femur. The other,

the successful amputation of a thigh, given in the 1st vol. *Lancet*, 1886, pain was felt only during the sawing of the bone.

The following four cases were also instances of the success of cocaine by hypodermic injection :—

1. The excavation of an extremely sensitive cavity with the dental engine ; no discomfort or pain whatever felt. Strength injected, 13 maxims of 4 per cent.

2. A young lady, aged 17, in whom 10 minims of a 4 per cent. solution was injected under the lip of the intra-orbital foramen, Complete anæsthesia on the left side of the nose.

3. A male, aged 27 ; the parts anæsthetised the same as the preceding. Excavation of crown cavity of right upper wisdom tooth was painful.

4. The patient, a male, attended for excavation of cervical cavity and lower buccal cavity. In ten minutes the cavities were excavated without pain. There were some uncomfortable sensations the following day ; after an injection of 2 minims on the second day the uncomfortable feeling was much lessened, but the original sensations returned on the third day, and were more pronounced on the fourth day.

As a submucous injection for purposes of extraction it had been extensively used, and 5 minims of 4 per cent. solution in the majority of cases produced insensibility to pain.

Professor Redard, of the Geneva Dental School, had given the results of forty cases. In all of them extraction was performed without pain ten minutes after injection, and there were no unpleasant after-results, excepting slight nausea.

Mr. Hern had recorded ninety cases of extraction as follows. Of the patients, 58 were females and 32 males ; the ages varied, 19 being under 15, 28 under 20, 24 between 20 and 30, 19 between 30 and 50. Seven minims of *fresh* 10 per cent. solution of hydrochlorate was used. The results as to pain were, 43 remarkably successful, no pain being complained of. In 40 cases (14 males, 26 females) the pain was reduced but not entirely removed. In seven there was considerable pain, the patients saying they felt no relief. In 15 cases there was slight constitutional disturbances, similar to those described by Dr. Cunningham. In 3 cases there were rather distressing toxic effects. In 1 case, a young girl of 18, after an injection of 8 minims, suffered a very great deal of pain, accompanied by palpitation, hysterical sobbing

and headache. An ice-bag was applied and she went to sleep, waking without feeling any constitutional derangement.

His general conclusions were, that more than 1 grain hypodermically injected produced constitutional disturbance, and less than $\frac{1}{2}$ grain was useless; the right dose, therefore, seemed to be $\frac{1}{2}$ grain. Further, that as an agent for general extraction, having regard to the mental suspense, the varying idiosyncrasies of patients, their being in possession of full consciousness, and that only one part of the mouth could be anæsthetised at a time, he felt bound to relegate the drug to a secondary position, leaving nitrous oxygen gas in full possession of the field.

The reading of the papers having exhausted the time usually occupied by the meetings, it was decided, after some conversation, to adjourn the discussion until November next.

ODONTO-CHIRURGICAL SOCIETY OF SCOTLAND.

(Concluded from page 243.)

MR. WALTER CAMPBELL read the following communication on
A NEW HYDRAULIC MOTOR FOR THE DENTAL ENGINE.

It is now thirteen years since I had the pleasure of bringing the dental engine before this Society. This engine does not now require commendation—it is in the surgery of every dentist worthy of the name. At the Society's meeting I have referred to, held in March, 1874, I then said, with reference to the usefulness of the dental engine—"All that is now wanting, is the adaption of water as a motor power, to make this the most useful mechanical appliance ever given to the dental profession." Since then, I have been constantly on the outlook for a suitable motor to drive the dental engine. At one time, I had great hopes of the turbine water motor, but I soon found it was not at all suitable for our purpose. It is admirable where a steady speed is required, and when it is not necessary to be frequently stopped. For intermittent work, it is not suited, on account of the time required to get up its speed, and also the time required to stop it. For variable work, it is not suitable. Either at greater or less speed than it is calculated for, it wastes water. For high pressure and small powers, it has to be made so small, and the speed has to be driven so great, that it is almost impossible to make it satisfactory for our work, which is both intermittent and variable.

Some years ago, I availed myself of the electric motor to drive my engine, but it was not a success ; it was, in my hands, unreliable, and required more attention than I cared to give it. Had I been an electrician I might have had the electric motor more under my control, and the bumming noise of the dynamo was, besides, objectionable. I am not the only one who has tried the electric motor and discarded it.

I have enquired as to the merits of the gas and hot-air engines with the view of ascertaining whether one or other could be made small enough, and be suitable for our work, and the result of these enquires has not been encouraging. Neither the gas nor the hot-air engine is very suitable for intermittent work, on account of the difficulty of starting, the heat, smell and noise, though minor, are also drawbacks to their use and practice.

At every Exhibition I have visited, machinery has always had an attraction for me, and it was at the Exhibition held in this city last year, that I first saw the hydraulic engine, which I have the pleasure of bringing before you to-day. On seeing it at work, it at once occurred to me that it could be made available for our purposes. Accordingly, I ordered one from the inventor, Mr Hastie, of Greenock, and, after a good deal of planning and perseverance on my part, I think I have at last succeeded in making this motor all that can be desired for dental work. I have no hesitation in saying that, with the new joint in the upright shaft, and other new arrangements in the dental engine, we have the most perfect combination of motor and dental engine of which I am aware. This joint in the upright shaft is a most valuable all-round movement, and gives an increased length (when required) of seven inches to the flexible arm. With this additional range of movement, I do not now see anything further to be desired. The only difference of opinion which might arise, as Mr. Brownlie, who came to Dundee to see it at work, remarked, would be as to the position for fixing the upright shaft. I have the upright shaft of my engine fixed at the left side of the chair (Morrison), about one inch from the left claw (or foot). Before finally fixing it here, I tried different positions with the ordinary foot-treadle, but found this the most satisfactory. I had the engine fixed in its present position, before I had thought of the new joint. I found it, however, in consequence of the fixed position, occasionally inconvenient. But since I have got this joint, as you now see it (and it has passed

through several stages of development) the hand-piece can be brought to any position.

This hydraulic engine, as you will see from the diagrams, is worked by two oscillating cylinders, and is specially suited for high pressures and intermittent work. Up to a certain limit, it can go at any speed, and it can be started or stopped almost instantaneously. It can be adapted to any pressure by using a counter-shaft to suit the position and adapting the patent adjustable stroke, which is a feature in Mr. Hastie's engine. In this way, the consumption of water is exactly in proportion to the work done.

Where conservative dentistry is practised, a motor for the dental engine will become, indeed, has already become, as great a necessity as the engine itself. I have been working my engine with this motor for more than three months, except when making any alterations on the new joint, and then I felt the want of it.

The advantages of a suitable motor for the dental engine were well expressed in a paper read by Dr. Teague "On Personal Hygiene," read at a meeting of the Southern Dental Association, America, and reported in the *Cosmos* for October last.

I will read one or two extracts from this paper, and from the discussion which followed:—"Prophylactic measures should be employed to ward off ailments—arm rests, to support the uplifted arm, and prevent nervous tension and overwork of the heart; operating stools, to secure a sitting posture whenever possible, thus avoiding bending of the body and hanging of the head, from which deleterious habits result lung troubles, intercostal, neuralgia, and vertigo; to say nothing of hæmorrhoids and varicose veins, which result from habitual standing.

"The dental engine should be worked by some power other than the foot, otherwise, one leg is in time rendered almost powerless by non-exertion, and the other is injured by over work.

"Dr. Winkler thought the essayist might have said more on the subject of motors. Water power is not reliable everywhere, and electricity, while very delightful when efficient, is very troublesome to keep up. The best motor, after all, was a big strapping negro.

"Dr. Hall Moore said, 'For six years I have used the Babcock motor, and the relief it gives is worth ten times the cost every year. But any motor that takes the place of foot power for the dental engine, will add from five to ten years to a dentist's life.'

"Dr. E. S. Chisholm has also used the 'coloured motor,' but not with satisfaction.

"Dr. Rembert uses a male motor.

"Dr. George Chisholm uses a young man for a motor, and so on."

I fully endorse all that these gentlemen have said as to the desirability of sitting as much as possible when at work. It is many years since I acquired the habit of sitting while operating, especially when filling; and with the motor, preparations of cavities may also be done with great ease sitting.

I have the knob, for regulating the movements of the engine, where the toe of my right foot would naturally rest—viz., in a line between the two feet of the chair, on the right side, and eight inches behind the front foot. These diagrams will give you an idea of the relative position of the several parts.

In showing you the different parts, I regret my inability to show them working. I can only add, with reference to its efficiency, that although it looks like a toy, I have more power than I require, and that it is under perfect control, going fast or slow, starting or stopping in an instant, and *always ready*.

The original cost is not great, and the cost of running the engine a mere trifle. The Water Company fitted a meter to my engine, and left it there for three months, to ascertain how much water it was likely to use. At the end of three months, the index registered something less than two thousand gallons. The meter is now removed, and I am to be charged twenty-one shillings a year.

A gentleman in this town has the same engine fitted up to drive a small turning lathe, and is to be charged at the same rate. This may be a guide for any Water Company as to the charge for water, to drive this small engine for dental purposes.

Messrs. Brownlie and Macleod, who came to Dundee to see the engine at work, will, I have no doubt, tell you what they think of it.

The motor and dental engine arrangements, will, I expect, soon be in the hands of Messrs Ash.

The PRESIDENT said that, representing the Odonto-Chirurgical Society, he had paid a visit to Mr. Campbell's surgery, so that he might see and test the motor at work, and report to the Society. He had very great pleasure in being able to report that the arrangement of motor and burring engine had all the good

qualities claimed for them by their inventors—viz., simplicity in construction, efficiency in action, steadiness and silence in working, perfection of control, moderate cost in installation, and economy in use. The power at disposal was much more than should ever be required in dental work, and could be regulated at will, while the installation was so adaptable to every circumstance of space and other local circumstances as to make it easily available in any operating room where the requisite water pressure could be obtained.

Mr. BROWNLIE said he could not speak from experience with this motor, but from the opportunity kindly offered him by Mr. Campbell of seeing his, he would say that it appeals very strongly to one's sense of fitness. It is simple and compact, and can be placed anywhere convenient. It is instant in starting, and works at once to its full power. It stops the moment the water is cut off. There is simply nothing to do preparatory but to put one's foot on the button, and at any moment in the twenty-four hours it instantly responds. There is no lamp to light, no temperature to get up, and no battery to vex one.

There is but one objectionable feature, and which only some operators will object to. It fixes the dental engine to one spot on the floor. He did not mean that it so limits one's use of the engine. Mr. Campbell's adjustment shows that the engine can be used as freely as before, only it cannot be moved away from the chair when not in use.

In this respect he hoped and believed in the possibility of still greater improvement. The motor itself leaves nothing to be desired, and he believed was destined to take an important part in dental operations, wherever there is a domestic water supply available.

The following communication, from Mr Whitehouse, London, was then read, on

COMPOSITION FOR DUPLICATING MODELS.

As I have much improved the duplicating composition which was brought under the notice of the Society two years ago, I have much pleasure in forwarding a sample for the members' inspection, also a model and plate, showing the perfect accuracy of the duplicate. In working the composition, I found that it absorbed water and tended to impoverish the material and destroy the perfectness of the duplicate obtained. After trying several

varnishes, and finding each defective, I think I have obtained the desideratum in a solution of india-rubber and benzoine. The solution is floated for a moment over the composition, and the surplus instantly poured off, and there is left behind an almost imperceptible coating, which is absolutely waterproof. As it now stands, I think it is perfect, and would feel pleased by members trying the composition and varnish, and at next meeting giving an expression of opinion.

The samples were then handed round, and the President agreed to test the composition and report.

The PRESIDENT then delivered the following short

VALEDICTORY ADDRESS

In vacating the chair of this Society, I may be allowed to express the pleasure which its occupancy has afforded me, and to thank the office-bearers and members for the hearty and consistent support which they have afforded me. Although nothing very startling has occurred in our history during the past two years, its existence has been marked by a steady maintenance of healthy interest amongst its members, and the addition of many minor contributions to histological, pathological, therapeutical and mechanical departments of our science, which, if they have not inaugurated a revolution in our practice, have materially assisted in the development of professional perfection.

We began the term of my office by a most interesting and well thought out paper on the "Missing Incisors in Man," by Dr. Edwards, of Madrid, which afforded ample scope for divergence of opinion, and led to a most friendly and instructive discussion. This was followed by "Illustrations of the Pathology and Physiology of the Teeth," by Mr. Watson; and at our next meeting we had a practical paper demonstrating the simplicity and effectiveness of Dr. Coffin's method of regulating the teeth by means of piano wire. At our next session we had a conversational meeting devoted to the "Treatment of Carious Teeth in Children," the leading part in which was taken by Mr. MacGregor, our senior vice-president elect, and our first year was closed by a most exhaustive paper on the "Mucous Membrane of the Mouth," by Mr. E. A. Cormack.

This year we opened with a masterly paper by Dr. Symington on "The Position and Relation of the Teeth in Children," in which

he gave us the results of original observation in sections of the head made while the cadaver was frozen. The vexed and still unsettled question of "*Pyorrhoea Alveolaris* et Etiology, Pathology, and Cure," next engaged our attention, and, more recently, an admirable treatise on "*Alveolar Hæmorrhage*," by Mr. Nicol, of Leeds, evoked expression of experience and opinion which was deemed so valuable by our southern contemporaries that special attention was called to the transaction on its republication in the pages of the Association journal. This brief catalogue of our more formal and prepared transactions gives, however, but a very meagre idea of the quantity or value of our business. Night after night cases in practice and abnormal specimens of dentition and methods of treatment, and mechanical appliances, were brought before the Society, and yielded a rich harvest of technical knowledge; and to-day we close the present session by a series of contributions and communications which I think the most distant member must admit has well repaid the dangers, the expenses, and discomfort incident to travel at this uncertain weather period of the year.

Before we meet again as a society, and before my esteemed friend and successor in this office—whose absence to-day through a serious illness, from which I am happy to say he is steadily though slowly recovering, somewhat mars the pleasure and completeness of our meeting—takes the chair, there will have been held in Washington City, U.S., the third International Medical Congress.

To the Dental Section of that Congress we may look forward with the fond anticipation that, affording as it will an opportunity for the leading minds of the profession in all countries to contribute their theories and their facts to the general stock of our knowledge, we shall meet together with our intellects refreshed, and find in the proceedings of that World's Congress matter on which to sharpen our wits, and strong food upon which we can chew the cud of reflection, and it may be assimilate for our own and our clients' good during the monthly gatherings of session 1887-88.

HERBERT SPENCER, the author of "*Synthetic Philosophy*," is at present at Brighton, and, we are sorry to learn, a great invalid.

BRITISH DENTAL ASSOCIATION.**MIDLAND COUNTIES' BRANCH.**

THE Annual Meeting of this Branch was held in Chester on April 29th, Mr. A. M. MATHEWS, President, in the Chair.

Mr. FRED. BULLIN, J.P., L.D.S., R.C.S.Eng., having been elected President of the Branch for the ensuing year, delivered an address. Having welcomed the members to "Rare Old Chester," a city which can boast of having been a civilized spot when London, York, Liverpool, and Manchester were unknown to either history or fame, he addressed himself chiefly to the younger members of the profession—to those who have somewhat recently taken the L.D.S. degree, *cum curriculo*, and gave a sketch of mechanical and operative dentistry practised forty years ago, as compared with the methods adopted at the present day.

He then referred to the professional and social status of the profession during that period, and in doing so he was aware he should incur the censure of some worthy members of the profession whom he would not willingly annoy. But he felt that he could not allow this opportunity to pass without stating his pent-up conviction of many years, and he was comforted by the thought that he should be expressing not only his own views upon the subject, but those of by far the larger portion of those who hold the L.D.S. degree of England, Ireland, and Scotland, as well as of Harvard and Michigan.

Mr. Bullin said: In the year 1855-56, there was a wide-spread desire among the dentists of this country to form an association for the purpose of founding a National School for the education of dentists, and for obtaining, by Act of Parliament, powers to institute a Board of Examiners authorised to grant diplomas of fitness and ability to practise dentistry. As the result of this outburst of a very legitimate feeling, over three hundred enrolled themselves during the first year as members or associates of what was prematurely called "The College of Dentists." We well remember how hopefully and laboriously many good men and true worked, with these objects in view, viz., their formal recognition as a distinct and legalized profession, and the future education of dentists. I am in possession of "The Transactions" of that body, and a list of the members who at the time joined; and when recently scanning, in that list, the names of many still living, and those of equally good men who have since passed away, I could not help feeling, that that list would compare favorably with any medical or surgical society in existence. You

may imagine how deeply pained the pioneers of that movement were, when, at meeting after meeting, letters of resignation were received from men of position in London, to whom the profession looked for assistance and guidance. The reason was soon discovered.

* * * * *

Humbly and persistently did those few (nearly all possessing the surgeon's degree) stand knocking at the door of Lincoln's Inn, engaged in the task of pleading for admission on any terms, on behalf of themselves and their country cousins, the majority of whom were not dressed in M.R.C.S. uniform. But their prayer was refused ; for what did the Council of the Surgeons' College know of dentistry ? Like persistent mendicants, although left out in the cold, they knocked again and again, and earnestly prayed for admission ; and even promised the Council to assist them with their dental knowledge at the Examining Board, if only they would take them and their poor relations in.

At last the prayer of the eighteen pilgrims was heard and granted, and the fate of the College of Dentists was sealed. The non-dental college applied for and obtained a dental charter, granted on the 8th September, 1859, which gave them power, by the aid of dentists, to institute examinations in dentistry, and with this our hopes of a Dental Act and Dental College, formed to meet the necessities of the age, were crushed.

From 1859 to 1863 the minority of us applied for permission to be examined, *sine curriculo*, by this novel tribunal. We stood the test of the examination, and, after handing over our gold to the coffers of the College, received certificates of fitness to practise dentistry. I fear the future dental historian will consider us a set of idiots for having paid a large fee simply to be informed (for our own and our patients' satisfaction) of what we knew before, that we were competent to practise dentistry. The idea of our profession being recognised by a Royal Charter had been dangled before the eyes of the College of Dentists. In time many favoured the plan, and meetings of the Odontological Society and the College were held, all naturally supposing that the terms would be liberal ; instead of which a charter was obtained, conferring power to institute dental examinations, and to grant certificates ; but not one word in the direction of making the recipients of them legalized practitioners, or granting them a single advantage enjoyed by the members of the College of Surgeons.

I have no hesitation in placing on record, as an opinion based on twenty-six years' observation, that the union with the College of Surgeons (so far as it can be called a union) was one of the greatest mistakes ever perpetrated by a body of well-meaning men—men, who, because the majority of them happen to possess the M.R.C.S. degree, longed for the maternal leading-strings, and led their provincial brethren into a dilemma, from which you, the future generation of dentists, will have to extricate yourselves.

I think I hear some worthy M.R.C.S. ask for proof of this assertion. I reply—

Firstly—The alliance was formed without the consent of the majority of the dentists of the United Kingdom then in practice, as the wishes of the profession were not consulted ;

Secondly—It was formed against the wishes of the great body of the medical profession ; and, therefore, can you wonder that the friction, then commenced, has continued to increase ? and that we have never been recognized as more than tooth-extractors by the majority of the members of the medical profession.

Thirdly—Because the Dental Charter did not confer upon us any of the advantages which the members of the College enjoyed, nor did it give us a legal status as a profession ; for although we stood the test of examination, and so many of our names were placed on the roll of the College of Surgeons from 1859, it was not until and by the Dentists' Act of 1878 that we were a legally constituted profession—a kind of dental raft, saved from the wreck of the proposed Medical Act Amendment Bill of that date, that was submerged for the time by disputes in the medical profession, and therefore did not become law until 1886.

* * * * *

Fourthly—Because the M.R.C.S. never was, and never will be, a dental degree, any more than the L.D.S. constitutes a general surgeon's degree. In saying this I cast no reflection upon those of our brethren who, by dint of industry and by residence in the metropolis and other large towns, have had opportunities, and have found it convenient, to take the M.R.C.S. in addition to the L.D.S. degree. But we cannot admit that this combination makes the M.R.C.S. a kind of dental degree. Suppose, for instance, you take nineteen out of twenty possessors of the M.R.C.S. or F.R.C.S. degrees into the operating room of one who has kept pace with the advancement of dental science, and consequently is in possession of the numberless

appliances unknown to the profession thirty years ago, and ask him the names and uses of those instruments. Would he recognize one out of fifty of them? No! And why? Because he is only a surgeon.

Again, when an M.R.C.S. sends you a patient, say with a molar whose pulp is diseased, and its fangs embedded in an alveolar abscess, for the purpose of having it extracted; suppose you, with the patient's consent, reduce the abscess, remove the diseased pulp, treat the cavity, and fill the tooth, who is so much surprised, if not annoyed, as the M.R.C.S. who sent him? If you ask him what treatment he would have adopted to produce like results, can he tell you? No! And why? Because he is only a surgeon.

Again, an M.R.C.S. extracts a tooth, and excessive hæmorrhage follows. He uses various styptics and plugs the socket, but without avail. The fainting condition of the patient threatens serious consequences, and in not unreasonable alarm he sends to you for dental aid. You hastily construct a denture, and fix it firmly in position. Soon the blood ceases to flow, and the surgeon's anxiety ceases with it. But the M.R.C.S. is an authorized practitioner of the healing art; then why did he, in his alarm, send for you? Why? Because he is only a surgeon.

Again, let us suppose a carriage accident has occurred; a wheel has passed over the patient's maxillæ; the superior one is crushed, and the inferior divided into two or more parts. The M.R.C.S. sends for you, and having placed the shattered bones *in situ*, you design and hastily construct metallic or vulcanite dentures, which, when applied and fixed, hold the shattered parts in their normal position. Meanwhile, ossification gradually goes on, and a cure is effected. Why did the M.R.C.S., in his helplessness, send for you? Why? Because he is only a surgeon.

This is only the fringe of the subject. I will not weary you with more cases. But how can the M.R.C.S. be a dental degree? The separation of the dental from the control of the medical profession would, I think, be very popular, and equally so to both. The Medical Council are no more competent to deal with the future of the dental profession than the Commander-in-Chief of the British Army would be to act as Admiral of the Fleet. If we may judge from reports, the Council would be pleased to be relieved of what has proved an arduous task. Twenty-two years after the Dental Charter was obtained, and the College of Surgeons, with the aid of dentists, had framed and

enforced the curriculum, the Medical Council had a long debate as to what class of the animal kingdom a dentist belonged, and what his habits, &c., were. The united wisdom of that collective body could get no further than that he was a "tooth extractor," but of a superior species of tooth extractor if he had taken the M.R.C.S.

At several of their meetings there were very warm and lengthened discussions on the advisability of attaching other degrees than dental to the names of the registered. One would have thought that common sense would have led them to decide that the L.D.S. of the Colleges of England, Scotland, and Ireland, with those of Harvard and Michigan, which they had selected for registration, would have been the only ones admissible to the "Dentists' Register." Some of the members, however, proposed the addition of medical degrees, while others were afraid of disgracing those degrees by so doing. One member thought that "the introduction into the 'Dentists' Register' of the sixty-two different titles, which were recognised by the Medical Act, would at least be inconvenient." One member asked another if he was aware that "a surgeon" (without being a dentist) "could practise as a dentist without registration," and the reply was, "I was not aware of it." Another member said—"The council had to determine what was really a higher qualification in dentistry, and that the question resolved itself into this: Is the membership of the College of Surgeons a higher qualification in dentistry? He should be somewhat influenced by the views which the surgeons did take—not the dental surgeons, who alone were capable of forming an opinion. One beam of light gleamed across the mental fog of that august chamber when a worthy M.D. rose and said, "There seems to be an idea in the minds of all present that dentistry consists in pulling out teeth, and one man has got on the register because he has pulled out thirteen thousand teeth; but I would remark that dentistry is not pulling teeth out, but keeping them in."

At another meeting we again find the surgeons and physicians, in council assembled, still in a fog over dental affairs. One member advocated both medical and dental degrees being placed upon the "Dentists' Register," to distinguish one dentist from another. "I think," he said, "it is very desirable, if barbers and sham apothecaries have got on the register, that good men should be allowed to put their higher qualifications on the list." To this another member replied, "I have a word to say about the dentists, and I earnestly

hope that this will be the last time that the dentists' question will be brought before us. We have had more trouble in the last two or three years with the dentists than we had during the whole preceding twenty years during which I have been a member of the council. Twice we have been summoned here to meet specially about it. Four times already we have altered the register, and this will be the fifth change we have made. From first to last the Dentists' Act has been the source of infinite trouble, and I believe it is likely to do very little good for either the dentists or the public."

Again, a member of the council, tired of the Quixotic conflicts over matters they did not understand, in very weariness of spirit, said—"I assure you I see with the greatest pain that gentleman opposite" (Mr. T——) "hanging day after day on the skirts of the council. He ought to be sitting here, or at the head of a Board of Dentists. The dentists have, from sheer want of proper guidance, made themselves a fragment, instead of an independent body. They come and pay their money here, which we spend for them, and they have not a single voice in anything that we do affecting them. I am ashamed of it, and I regret it deeply. They ought never to have submitted to such an Act."

* * * * *

This opinion is shared by the great body of both the medical and dental professions. The former has shown in the lecture-room of the hospital, at the clinical lectures, that the "dentals" have been treated as interlopers. The stigma clings to the hard-working dental student, when, after five years' anxious study, he has passed victoriously from the portals of Lincoln's Inn, and he is treated through life as only a tooth-extractor.

* * * * *

I have heard two reasons assigned for such treatment, and they constitute a strong argument in favour of our becoming a distinct body:—

Firstly—Because of the annoyance felt by the medical profession, at the time we became "a fragment" grafted into that body in 1859, has not died out, but is inherited by the younger members ;

Secondly—Because it is a fact that we have upon the "Dentists' Register" a certain number of barber dentists. This fact we deplore, but do not deny. But they are not so many in number as there were upon the first "Medical Register." We may also remind the members of the Medical Council that to-day there are hordes of barber

surgeons and barber physicians in this country, holding college degrees, with their names upon the "Medical Register," who are selling toilet requisites over the counters of dirty shops, or disgracing their profession by practising as specialists for the cure of nervous debility and other unmentionable ailments ; issuing pamphlets to entrap the unwary, and extorting money from those who, they know, dare not expose their misdoings, lest they themselves should be exposed to their friends as the victims of a vicious life. No doubt the M.R.C.S. or M.D. will say such an one is "*un mauvais sujet*." Granted ; but no worse in the dental than in the medical world ; and "they who live in glass houses should not throw stones."

Need I say that our very presence here to-day, as a separate Association, as distinct from the Medical Association, adds force to my contention that we are, and ever shall be, a separate profession. Why then should we not be a representative body, with our own council and our own board of examiners, and stand in a position to obtain Dental Acts of Parliament, and be entrusted with the management of our own affairs ? The surgical degree has been the bane of our profession, and I am weary of hearing some of our esteemed brethren urge dental students to go in for the M.R.C.S. degree. The sound has been ringing in our ears for years, and with this result, that nineteen out of twenty have not done so since 1859, and will not do so, for the simple reason that they select the dental in preference to the medical profession. They even consider that the L.D.S. degree, which takes a provincial man five years to gain, and costs him more money, is a higher one than the M.R.C.S., which can be obtained by only four years' application, and with a less expenditure of money. If the advice so kindly given be only moderately adopted, you perpetuate the evils of the past—two classes of dentists are created, one feeling itself supremely superior to the other. A student is asked to spend extra time and money in gaining a degree which, when obtained, professional etiquette forbids him to carry into practice, under pain of being ostracised by other members of the "charmed circle."

I am not alone in the belief that many of our brethren in large towns have a craze for the multiplication of degrees. A wag has said that in cases of men of short stature a degree adds an inch or two to their physical as well as to their mental stature. It certainly prevents them from seeing clearly through the L.D.S. spectacles.

In the remarks I have earnestly made, from the deepest feelings of

conviction, I wish to place on record, that there are amongst us to-day many honourable exceptions to the rule—men with the L.D.S. and M.R.C.S. degrees whose hearts are devoted to the present and future welfare of our profession, and who have no sympathy with the fantastic gentlemen I have described.

Throughout, I have studiously avoided the use of names, for I have no desire to hold up to ridicule, or to pain any individual member of our profession. There ever will be, in every profession, men who occupy the "boxes" and "dress circle," and look with disdain upon their brethren, whom they place in the "pit" and "gallery." Such usually strive to lead; but they are the enemies of any useful reforms. I have endeavoured to point out the great mistake of 1859. But while doing so, I give those who made it full credit for the best intentions, their mental vision being clouded.

Some, whose features are still in our memories, are gone to their rest. The minority only of them remain; and even they, or certainly their sons, whom we all esteem, as bearers of honoured names, will in due time help you in your legitimate and forward movement in dental reform.

* * * * *

In conclusion, I ask you to believe me when I say that nothing but a sheer sense of duty to, and a deep regard for our younger brethren's future welfare, would have induced me to enter upon this formerly much-debated subject. Of all men, those of us who have individually, through three decades, striven by avoiding unprofessional conduct, to elevate the profession to which we belong, are personally least interested in its future; for of necessity we must soon lay down our weapons of warfare and retire from the fight, and pass away, to be no more seen. But it would be culpably selfish if, with the experience of the past and the present, by which alone we get a glimpse of the future, we did not express our conviction that the dental profession has a great future before it. The advance of dental science has been most rapid, and is still progressing. The demand for dental aid has marvellously increased, and is still increasing; and the dental profession is destined to be second to none in existence.

Then, I say, go on raising its social status, by individual conduct in your private practice; and, by combining with the British Dental Association, and by forming local branches of it, throw aside the paltry pride and professional jealousies of your forefathers. March shoulder to shoulder with brethren who may not be quite up to your

standard intellectually or financially. The efforts of all will be needed in the common cause of dental reform, social and legal. Knock hard, and as a profession, independently, at the door of St. Stephen's, and, as yours is a righteous cause, you will overcome all opposition, and victory will be yours.

THE WAITE TESTIMONIAL.

During the meeting an Address and a purse of £381 were presented to Dr. Waite. Mr. J. Smith Turner made the presentation, and the following is a copy of the Address :—

BRITISH DENTAL ASSOCIATION.

To W. H. Waite, Esq., D.D.S., F.D.S.,

OXFORD STREET, LIVERPOOL.

DEAR SIR,—We, the undersigned Members of the Dental Profession, cannot but regard your retirement from the active pursuit of your professional duties as a fitting occasion on which to convey to you some expression of the high esteem in which you are held amongst us, both with regard to your personal character and the honourable position you have attained as a member of our profession, and of our appreciation of the value of the services you have rendered in promoting the cause of dental education and organization.

As one of the Pioneers of Dental Reform, you contributed valuable aid in securing the ultimate success of that movement which, culminating in the passing of The Dentists' Act of 1878, secured to Dentistry throughout the United Kingdom the Status and Privileges of a Liberal Profession.

As a member of the Representative Board of the British Dental Association, your clear and liberal views, your unflagging zeal, and your habitual self-sacrifice, have gained the sincere admiration of your colleagues; and to your persistent advocacy and generous liberality may, to a large extent, be attributed the existence of the Dental Benevolent Fund.

You will ever be remembered, especially in this district, as the founder of the Midland Branch of the British Dental Association; and to your services as Honorary Secretary, continuously rendered from the first, the Association owes the success of what has been aptly termed its Model Branch.

By the Dental Profession, at home and abroad, you are widely respected for your kindness of heart, your sterling integrity, and your able and consistent advocacy of all that is just, liberal, and enlightened; and you now carry with you the deep and affectionate sympathy of both British and American friends, the latter of whom participate in this expression of our regard.

We beg of you to accept this Address, the Book of Signatures and Letters, and the accompanying purse of 381 sovereigns (81 being contributed by your American friends), with our united and earnest hope that you may long be spared to promote, by your counsel and influence, the welfare and interests of the Dental Profession.

Presented, on behalf of the Subscribers, by James Smith Turner, Esq., M.R.C.S., L.D.S., Vice-President of the British Dental Association, at the Annual Meeting of the Midland Branch, held at Chester, April 29th, 1887.

Signed, on behalf of the subscribers,

S. WORMALD (Chairman).

I. RENSHAW (Secretary).

T. MURPHY (Treasurer).

H. CAMPION, first President of the Midland Branch.

A. M. MATTHEWS, ex-President of the Midland Branch.

F. BULLIN, President of the Midland Branch.

EDWIN SAUNDERS, Knt., President British Dental Association.

JOHN TOMES, Knt., President Representative Board of British Dental Association.

JAMES SMITH TURNER, Vice-President Representative Board of British Dental Association.

FREDK. CANTON, Treasurer British Dental Association.

MORTON SMALE, Secretary British Dental Association.

W. C. BARRETT, Buffalo, N.Y., for American Friends.

CORRESPONDENCE.

COMBINED TIN AND GOLD FILLINGS.

To the Editor of the DENTAL RECORD.

SIR,—On page 207 of the RECORD for May, it is stated by Mr. Cunningham that a rolled rope of tin and gold was first used by Dr. Abbott, of Berlin, some 25 years ago. This is a mistake. I used this method commonly at least 25 or 27 years ago, and my information as to its value in practice was obtained from Mr. Lomax, of Manchester, a well-known and most successful operator, who had used it constantly for many years previous to the time I commenced. Both Mr. Lomax and myself always used rolls with the gold projecting at the upper end, and this part of the gold I invariably annealed, so as to obtain a hard surface of pure gold in the plug. When I commenced to use this method of combining the gold and tin, I understood it was both old and well-known to many operators.

THOS. FLETCHER.

Warrington, 11th May, 1887.

GOSSIP.

THE "Medical Register" and the "Dentists' Register" for 1887 have recently been published. Both of the registers have been subjected to the most thorough revision, and no efforts spared to render them complete.

In the case of the "Medical Register," a circular of inquiry was sent to every registered practitioner at the beginning of the year, and in November voting-papers were also sent out in connection with the election of direct representatives on the Medical Council. As the result of these inquiries a great number of inaccuracies of address were discovered and corrected.

In the introductory part of the volume the new Medical Act of 1886 has been (with the older Acts) printed, for the information of the profession, and a table has been added, showing the qualifications in sanitary science which have become registerable under this new Act. In addition also to the other statistical information usually given, a table is introduced showing the number of practitioners resident in each division of the United Kingdom. To render possible more ready reference, the contents of each page in both registers is now indicated by initial headings.

In the case of the "Dentists' Register" care has been taken in the introductory portion to make clearly evident in what respects the enactments of the "Medical Act (1886)" have modified the provisions of the Dentists' Act of 1878.

The number of persons upon, and the additions of qualified men to, the "Dentists' Register" during the past five years were:—

	1882.	1883.	1884.	1885.	1886.	1887.
Number on Register ...	5,345	5,257	5,296	5,264	5,209	5,207
Increase of Qualified...	—	62	43	37	32	65

THE following members of the Dental Profession were present at the Levée on 21st May:—Dr. Smith, Vice-President of the

Royal College of Surgeons of Edinburgh, and Surgeon-Dentist to the Queen in Scotland, by the Lord Chamberlain. Mr. Hamilton Cartwright, by Sir Lionel Darrell. Captain Gurnell E. Hammond, Duke of Wellington's Regiment, 4th Battalion, by Colonel Duke of Wellington.

THREE lectures on "Certain Diseases of the Jaws" will be delivered in the Theatre of the Royal College of Surgeons of England, on Wednesday, Friday, and Monday, June 8th, 10th, and 13th, at four o'clock each day, by Professor Christopher Heath, F.R.C.S.

Lecture 1.—Wednesday, June 8th: On Cystic Diseases of the Jaws.

Lecture 2.—Friday, June 10th: On Tumours of the Jaws.

Lecture 3.—Monday, June 13: On Diseases of the Temporo-Maxillary Articulation, and Closure of the Jaws.

MR. JOHN WOOD, L.D.S.I., has been appointed Dental Surgeon to the Brighton Dental Hospital, *vice* W. L. Poundall, resigned; C. M. Cunningham, D.D.S.Mich. and L.D.S.Edin., and E. L. Norris, L.D.S.Eng., have also been appointed Dental Surgeons to the same Hospital. Mr. Richard Denison Pedley, F.R.C.S.Edin., M.R.C.S. and L.D.S.Eng., has been appointed Assistant Dental Surgeon to the National Dental Hospital.

At the monthly meeting of the Dental Students' Society of the National Dental Hospital, Mr. James Rymer drew attention to a condition in the mouth of a boy aged 18, where there appeared an absence (supposed to be developmental) of the front portion of the inferior maxilla, including the tip of the tongue. Mr. Alfred Prager read a paper on "Art in Relation to Dentistry," in which he urged his hearers to observe what great importance must be attached to the expression of the face by the arrangement of the dental arch, whether in regulation treatment or in the artificial substitution of the teeth. He cited as examples the various expressions obtained by the great masters by the disposition of the mouth and teeth, and pointed out that with the same features a change could easily be produced from one of the highest intelligence to that of idiocy, and from repose to anger.

PHYSICISTS have for some time looked doubtfully on the elementary constitution of many of the sixty-five or more substances which are given in text-books on chemistry as elements; and the latest investigations of Mr. Crookes have served to make their right to be named elements still more questionable. To rightly understand the value of his conclusions, we must bear in mind that every metal in its spectrum, has written its autograph by its molecules. The bands of colour are ever there, and in the same position, though sometimes a single band has been separated by finer instruments into two bands, as in the well known D line, which demonstrates the presence of Sodium. The problem attacked

by Mr. Crookes was the metal Yttrium, which has a spectrum, made up of five lines, one of which is double. Using a very dilute solution of Yttrium and an equally dilute solution of ammonia, so that many hours elapsed before even turbidity was produced, after many days a precipitate resulted; this he distinguished as *Ga*. The remaining clear fluid was then treated with a stronger solution of ammonia, and after a considerable time a precipitate, *Gb*, was formed. This process was continued with a stronger and stronger ammonia precipitant until *Gc*, *Gd* and *Ge* were separately formed, and no further effect could be produced. Each of these precipitates was examined by the spectrum produced with the electric spark, and was found undeniably to correspond to one of the five lines, though not in the order in which they stand in the Yttrium spectrum. Had these precipitates been Yttrium in different conditions, there would have resulted the five-lined spectrum of Yttrium in each case; but as there only resulted one of the five in each case, it is fair to assume that these five substances are the components of the so-called Yttrium. If this assumption be a true one, we may have to unlearn our chemistry and go back to that of those grand old fellows, the Alchemists, who held that gold only differed from baser metals by containing more of that subtle principle for which they were ever seeking, which Mr. Crookes has named protyle, and which he considers may have been the origin of all matter.

OZONE is said to be formed in the air by the action of sunlight on clouds. When clouds are continually formed from above they all become loaded with ozone—while, when they are formed from below, only the upper layer will contain much ozone. In the former case the accumulation of ozone causes the clouds to become strongly negatively electric, and to give rise to thunderstorms.

By means of a lense constructed for him on new principles, by an English maker, Dr. Dallinger has discovered an organism entirely new to science. It is endowed with six motile fibres, and acts as a gleaner in putrefactive fluids, hitherto considered as exhausted, breaking up the minute particles into their original elements until not a vestige remains.

AN earthquake consists of a very large number of successive vibrations. In some cases three hundred have been registered. They are irregular in period. Their amplitude is not many twenty-fifths of an inch. When the earthquake is of sufficient force to throw down chimneys and crack walls, the vertical motion does not often exceed the one-twentieth of an inch. The periods of principal motions are usually from half a second to a second.

BLOCKS, plates, and rods of carbon for electrical purposes are now made from seaweed. The algæ is cleansed by hot water, dried and carbonized. The resulting produce is then treated with dilute acid, leaving a pure and very soft carbon which can be moulded by proper machinery.

To diminish local action in battery plates, a patent has been obtained for coating them with mineral fat or grease, containing an amalgam of mercury and a metal analogous to the soluble electrode.

THE plan of Professor Trowbridge for communicating between two ships in mid-ocean by a current of electricity passing through two wires hung over the ships' sides and dipping into the sea, the circuit being completed by the water, has been further developed and modified by Mr. Edison. It is reported that he has succeeded in transmitting sound between ships three or four miles apart, and expects better results when the apparatus is perfected. Edison has not been able to transmit articulate sounds, but has utilized long and short sounds of submarine explosions, on the principle of the long and short lines used in the Morse telegraph.

THE notion usually entertained, that Yeast is merely added in bread-making to make it light, is not correct. There are many ways of ærating dough and making bread spongy, but fermentation is the only method capable of inducing the changes which are essential to the making of bread of the finest quality. By the action of yeast the gluten is softened and mellowed, undergoing a species of digestive action, partly physical and, probably, partly chemical, and, further, a characteristic and pleasant flavour is imparted to the bread, absolutely unattainable by any other means. Æration by other methods produces bread which has a raw, uncooked taste, of which the palate speedily tires.

THE curing of tobacco, in order to give it the bouquet so much coveted by the smoker, is a process more curious than beautiful. According to Mr. MacKinnon, who has had considerable experience in the manufacture, the leaves are first dried in the shade and then dipped in a mixture consisting of the refuse of the crop and a small quantity of urine, this mixture being in a state of fermentation. After immersion in this liquid, the leaves are laid flat on a board in piles until the fermentation has proceeded far enough, which is determined by the temperature. The temperature is then reduced by exposing the leaves to the air. The process is once repeated, after which the leaves are in a proper condition for being made into cigars. The tobacco known as "honey dew" is said to owe its peculiar flavour to the addition of nitro-benzole, or artificial oil of almonds.

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EXTRACTS FROM LECTURES ON OPERATIVE DENTAL SURGERY.

By WILLIAM ST. GEORGE ELLIOTT, M.D., D.D.S.

(Delivered at the National Dental College.)

(Continued from page 254.)

I HAVE already briefly spoken of the principles governing the filling of teeth with soft foil. They are few and simple, and so are the appliances. Ordinarily there is no difficulty in securing the requisite partial dryness with napkins, bibulous paper, &c.; but when, for any reason, there is likelihood of a protracted operation, recourse must be had to the rubber dam, the use of which will be referred to more fully when we come to speak in detail of cohesive work. In using soft foil, dryness, while an advantage, is not indispensable; good fillings can be made under water, but they must be considered exceptional. Soft foil—that is, unannealed gold—if properly used, is capable of giving much better results than we ordinarily see; in fact, a good dense waterproof plug is by no means the rule, but it is not the fault of the material. Gold, in any form, requires a good deal of force to properly condense it, and because it is soft and readily adapts itself to the walls of a cavity, leads many operators to think it unnecessary to use more than simply hand pressure; but, gentlemen, always aim at the best results only—do not be satisfied with “good enough” or “that will do.” By all means, while you are young, get into the habit of thoroughness, and then when you get older and more crowded for time, the habit will cling to you in spite of the temptation to hurry over work. As I have already said, always try to mallet in your soft foil stoppings; by so doing you can get them nearly as solid as if made of cohesive gold.

The instruments necessary are a few right-angled pluggers of

different sizes, generally with smooth rounded points, a couple of foot instruments for lateral condensing, a couple of right-angled square coned points for opening and enlarging holes in the soft foil already introduced, to be subsequently filled with smaller pieces of gold.

The process is practically the same as for tin and gold. I am indebted to Dr. Cohen, of Hamburg, for the suggestion to use heavy foil in the interior of a rope of soft ; in this way we get the facility of operation so noticeable in tin and gold ; it prevents the instrument from puncturing the gold and enables us to carry the fold of rope or ribbon to the bottom of the cavity without difficulty. I have used No. 30 rolled gold inside No. 4 foil rolled into a rope ; but I think that No. 20 would be better than the No. 30. Of course it is the thick tin foil which plays the same part in tin and gold.

Now let us turn our attention once more to cohesive foil, looking more into details.

The two most valuable additions we have ever had to our list of appliances are unquestionably the dental engine and the rubber dam. As far as I can ascertain, Dr. Green made the first dental engine about 1868 ; it was a screw in the hand-piece rotated by pneumatic pressure, derived from a foot bellows. This instrument did not meet with much success, but about 1871 Dr. Morrison, of St. Louis, brought out the well-known Morrison engine, which at once became generally used and has continued a favourite ever since ; had the hand-piece been more efficient, it would even now contest the field with the best. Dr. Green brought out the electric engine in 1872 ; it had a fair sale, and now, after years, when we consider the great advance made in our knowledge of electricity within the last ten years, we are surprised at Dr. Green's achievement.

Certainly the little bi-chromate battery that came out with the instrument, with the means of lowering and raising the zincs, was quite equal, or nearly so, to what we have now. I used the engine for some months, but was not satisfied with it. There was always deficient power ; the battery, like all subsequent ones, was unreliable, expensive and troublesome, and when the Morrison came to me in Japan, the little Green was put upon the shelf, where it has remained.

About 1874 Messrs. S. S. White brought out their adaptation

to dental purposes of the Stowe flexible shaft, the peculiarity of which is that the strands of piano wire forming the cable are twisted in opposite directions to prevent back-lash, and totally different from the spiral spring introduced by Nasmyth. This engine is probably better known throughout the world than any other, although in this country the Shaw is more used. Personally, I prefer the S. S. White cable, although I do not, as you know, use the rest of the engine. A good deal depends upon one's habit in operating, &c.—whether you admit your patient to the chair by the right or left side, because if the latter, then you cannot conveniently use either the Shaw or the Bonwill engine, as both have rigid arms, which knock instruments from your operating table and are generally in the way, especially if your cabinet is close on the right side.

If your patient leaves the chair by the right side, then, by having your table swing to the left out of the way, you can have any engine you fancy. Those of you who came to our clinic last winter may remember my arrangements. I have an Otto gas engine in the workroom which is on a level with, and some 25 feet from the operating room; this gas engine does all the work of polishing, turning (3 lathes), wire drawing, &c.; it also drives a counter shaft just under the floor, which counter drives the cord, which passing under the room, comes out beside the chair at the dental engine. You may remember that it took a good many months to perfect the system, but for over a year it has now been in use, giving perfect satisfaction. When running the dental

the gas engine consumes some four or five feet per g, at the London rate for gas, one penny; of course when polishing, &c., is being done in the work room, the consumption is greater, always however in proportion to the work done. The engine (a 5-man power Otto) can give out as a maximum about 1.3-horse power; but to do this necessitates running it up to double my ordinary speed (125 revolutions), with a consequent increase of noise, for an Otto gas engine is not "silent," and as the engine is only some twelve feet from my operating room, a noise is objectionable.

With my Jones' dynamo, I can get some 125 candles, but, as there is no balance-wheel on the dynamo, the lights consequently fluctuate with the necessary irregular movement of the engine, which can then only take gas every other revolution.

In my daily routine of work, it only takes gas every eight revolutions, and when at its best and no load on it, will make fourteen revolutions for one explosion of gas. For large practices, I think that the arrangement I have can hardly be improved either in economy or efficiency; but as the first cost is considerable (about £100), and, as many would not have any use for the surplus power, I have experimented with a new hot air motor made by Koerber, of Frith Street, Soho, which holds out the promise that for those who cannot indulge in an Otto it will meet all requirements. You get with it ample power and speed, I believe (but I have only used it experimentally), with but little or no noise, but for the power given out it is not so economical of gas, requiring some ten feet per hour, and giving out merely a sufficiency of power for the dental engine alone.

Two great advantages have developed themselves from the use of power for the dental engine, and anyone who has experienced these advantages will be loth to go back to the old treadle.

The first is speed. When I first put in power, I had three speeds adjusted, one of 800, one 1,200 and one 2,500. The low speed is very quiet, and for timid patients has an advantage in that way, but I have gradually used the two highest speeds more and more, until I now use then almost exclusively, the advantage being that the burs cut so much more rapidly and with less jar, but of course the humming sound is greater with high speed.

The second and equally important advantage is the perfect and automatic control of the speed; a steel pin coming through the floor beside the engine is connected with the belt that drives it, so that by pressing the pin with the foot the belt is tightened and the bur moves at once, moving slowly and weakly if the pin is only pressed slightly, and faster and more strongly if pressed harder; if released the engine stops at once. It is automatic in this way. I always press the pin hard enough only to do the work, and if the bur catches, as between the teeth, &c., the engine stops at once. No one who has not experienced this advantage can realize its importance.

Again, it is a great comfort to be able to sit down and, without fatigue or motion of the body, do most of the work, as the engine can of course be used not only for straight burs, but also with the right angle attachment, as well as with straight and right angle engine mallets.

A PROFESSIONAL HOLIDAY.

By GEORGE CUNNINGHAM, B.A.Cantab., D.M.D.Harv., L.D.S.Eng.

(Concluded from page 263.)

THE high feeling which pervades the discussion of dental politics in Germany will be better appreciated after a perusal of these notes, which I have carefully prepared from numerous conversations I had during this meeting with several of the leaders of the profession there. It will not be amiss to say that the information I have given of the state of the dental profession and dental education in Germany has been derived from authoritative sources and has been kindly revised by "one who knows." It is, perhaps, worth noting how rapidly the question of the professional education of the dental practitioner has come to the front in recent years on the continent of Europe. The scheme of professional education adopted by Germany is not nearly so complete nor so extensive as that existing in Great Britain, but it is being carried out with such energy and with such practical success that the hope may reasonably be entertained of the curriculum being extended at no very distant date. The very excellence of the work done in the dental schools at Berlin, Leipzig and Halle, should certainly lead to the just demand for an extension of the limited period of study presently required of the German dental student. The flourishing nature, too, of the dental schools now instituted in France and in Switzerland should encourage Austria, Hungary and Sweden at once to carry out the proposals which have been made for establishing similar dental institutions in these countries.

The experience of the dental schools already established should convince those in Austria who are urging on the cause of dental education not to limit the aim and scope of their proposed dental schools to medical practitioners alone. The benefit of such a school to the State might be great, but immeasurably greater if so extended as to include the great mass, and not the select few who constitute the dental profession.

From my description of the dental department in connection with the University of Budapest, I think it must be at once admitted that in no medical school in this country is there anything like so complete, so thorough, and so systematic teaching

and training of the medical student in the principles and practice of dental surgery.

A prominent feature of the Berlin Congress was the extensive and excellent museum, which was largely attended not only by members but by a large section of the "paying" public. The Dental Section was especially praiseworthy and excellently arranged. In addition to the usual dental depôt exhibits, which are nearly always well done and which in this instance attracted a considerable amount of the attention of the ordinary visitors, a very interesting and instructive display was made by three professional organizations. The largest and most important was the exhibit of the Berlin Dental Institute, which included a fine collection of Professor Miller's cultivations of the various micro-organisms found in the mouth. An especially interesting exhibit of obturators and other artistic artificial restorations of facial and palatal defects was made by the Central Verein Deutscher Zahnärzte, which, if not exactly yet in some respects is the analogue of our British Dental Association. The most striking exhibit of all, however, and perhaps the best from an educational point of view, was that made by the Technical School of the Zahnkünstler Innung.

This school has been started by the Society of Mechanical Dentists (Zahntechniker). I was told that the school was merely a "blind," with a view of creating some claim for recognition at the hands of the State. However that may be, no one could deny the excellence of the exhibit of the school.

As we know right well, the success of the most scientific of congresses depends in no small matter on the excellence of the social entertainments, and I feel that one would be charge of a lack of appreciation of the munificent hospitality shown us at Berlin were we to close the record of an official holiday without some allusion to the more convivial side of the great meeting. I have always held that the English manage that aspect of a great meeting better than the Americans; certainly this has been my experience in dental gatherings on both sides of the Atlantic. After the Berlin meeting, however, I do think the Germans take the—well, the palm—in this respect, that they do so much more with less prodigality of expenditure of mere money, often from the simple means employed, but mostly from the enthusiasm, the cordiality, the thorough bonhomie which

everyone exhibits, so that even the most starchy Britisher adapts himself to the occasion as if to the manner born.

Besides the inevitable banquet, there were two special performances at the Royal Opera House and in the Royal Theatre, a musical promenade in the Winter Garden almost every evening, with a grand ball at the close of the meeting. The Berlin Yacht Club entertained the members, including special trains and steamboats at a sailing regatta. In the large and picturesque grounds of the Zoological Gardens there was a splendid concert by two of the finest military bands, with illuminations and fireworks. The feature of this entertainment was the "free" and unstinted distribution of the thousand-and-one varieties of Lager beer. The grandest entertainment of all was certainly the Stadt Fête, given by the Municipality of Berlin, in the grounds of the Jubilee Art Exhibition. Here, after a military concert and other entertainments, some 7,000 sat down to an excellent banquet. The liberality of the entertainment may be gathered from the fact that provision was made for 3 litres of wine and 4 of lager per guest, and all the cafés and restaurants in the grounds kept literally open house till the small hours of the morning. After the banquet, the artists of Berlin and their friends, to the number of some hundreds, made a triumphal torchlight procession on cars, on chariots, and on foot, to the colossal frontage of the reproduction of the Ancient Temple of Pergamon, where they performed an original Greek play in pantomime with choruses. The striking magnificence of this sight, and the uproarious enthusiasm with which it was received, passes description. After the return of the procession, the pseudo-Greeks, in their antique garb, mingled with their friends in the crowd. Fun and hilarity reigned supreme.

A night with an assembly of the old students (Alten Burschen-Schafter) was none the less interesting because we found the familiar face of one who presided as gracefully and as efficiently over a genuine enthusiastic German Kneipe as he did over the Dental Section of the Congress.

Picture to yourself a large hall with five long tables, at the centre the President and at the others the croupiers, each with a gay "baby" edition of our forage cap fixed in some unfathomable manner on his head, enormous gauntlets on his hands, and a gorgeous sash, with a ponderous sword in front of him, while the fantastic caps of the various students' corps

serve to identify the various universities represented in the general company.

A string band on the stage wiles away the wait between the charging of your glasses, or serves as a cover for friendly gossip. After a thundering clang of the swords on the several tables and the ringing "silencium" of the presidents, the whole company break into a hearty chorus, or pledge a toast in the flowing lager in an atmosphere of smoke. A "book of the words" and a familiarity with many of the tunes, often from their being transmuted into hymns in our own country, enabled us to join more or less effectually in the convivial song.

After the academic strains of the well-known—

"O jerum, jerum, jerum, O quæ mutatio rerum!"

a curious ditty humorously recounting the troubles that befell the noble Ichthyosaurus in the degenerate days of the Lias formation, perhaps pleased us most. Not unworthy of the occasion was the quaint conceit of the rabid Pleiosaurus, exulting in socialistic riot, while the bibulous Pterodactyle flies reeling home to bed, and the amorous Iguanodon dares to kiss the Ichthyosaura in broad daylight, and all the Saurian race coming to a hapless end from a profligate use of the chalk in scoring up their unpaid drinks till their riot and the sighs of the grand old Ichthyosaurus are drowned in the hiss and the roar of the flood.

Nor is it an ordinary convivial meeting, surely, where a Murchison scholar of Edinburgh University clinks glasses with the well-known professor in Berlin who translated the works of Murchison into German; and where an old dental student shouts an energetic "Prosit!" to such tried friends of c as the head of the Berlin Dental Institute, or of the dental department of the University of Halle.

Even as that jovial Kneipe ended with a galaxy of bright memories untarnished by any sad reflection on the morrow, so ended a professional holiday only dimmed by the fear that the opportunity of returning the favours shown by so many professional friends, at least in kind if not degree, might never be afforded the grateful recipient.

L'ENVOI.

The somewhat unusual nature of this communication in the pages of a professional journal may account for the following

slight adaptation of a graceful rondel from some Cambridge students' "Rhymes and Renderings":—

" If an hour my tale engages,
Seems the hour not all ill-spent?
'Twas the sum of my intent."

THE MOUTH: IN ART AND EXPRESSION.

A paper read before the Students' Society of the National Dental College,

By ALFRED PRAGER, L.D.S.I.

THE subject of my paper, I fear, will hardly commend itself to a Society of so scientific a bias as the one I have the pleasure of addressing.

It is my constant impression, however, that in our pursuit the weariness of Science might with advantage be oftener enlivened by the companionship of her more cheerful sister—Art: that the continued and never-ending inquiry after that far-off philosopher's stone—the cause of dental caries; or that never-to-be-solved mystery—the perfect way in treating the exposed dental pulp, should be more frequently varied by our consideration of other matters, which are also of very great importance, albeit from a collateral or abstract point of view.

With this object I have strung together a few notes made at odd times, upon a subject that to me possesses the greatest attraction, viz.: The human mouth, as a means of expression, regarding it chiefly from its artistic and picturesque aspect.

The mouth, of all the other features, is, by its mobile sensibility, the one that most readily betrays the mental emotions.

It is by the mouth that character may be most easily delineated by the physiognomist; it is the mouth also, as I shall show further on, that may be at once the delight and the despair of the artist.

How seldom does the dental student bear in mind the responsibility he is under, or for what he may be answerable in point of artistic expression and effect, when manipulating the human mouth! How often does the average dentist consider the inestimable consequences or loss to the harmonious effect of the whole face that the most trifling fault in the arrangement of a set of teeth will cause? How unconscious also does he invariably seem to be of the beautiful harmonies or contrasts of colour and line it is in

his power to call up in the face by such seemingly prosaic means as a set of false teeth! This power is his indeed, yet how few there are who consider it worth their while to pay any regard to æsthetic results, or who are sufficiently imbued with that artistic feeling they are rightly expected to exercise in their capacity of mouth-artists! I will offer no apology for having misapplied this last term.

In a paper like this, it will be impossible for me to do more than hereafter just briefly touch upon those appearances of the mouth or arrangements of the teeth which could be termed artistic or beautiful. It is always an extremely difficult, not to say perilous, task to attempt to give any definite explanation or to set up any standard of the beautiful. Beauty—or rather its appreciation—is so much a subjective emotion and so much a matter of individual instinct and education.

The finer a person's senses, the more sensitive his feelings, and the more extensive his knowledge, the greater and truer will be his appreciation of and delight in the beautiful. To return to the mouth, however.

The student may, by closely and intelligently studying perfect works of art, as well as the human face, acquire taste and discrimination in discerning those varieties of beautiful form, line and colour about this feature to which I have alluded.

If any of you are interested in this inquiry, I would recommend you to go to the National Gallery, and, amongst other celebrated and instructive works of art, to observe particularly a picture by Guido, No. 177, Room 10. It is a head of the Virgin, and, I think, the most beautiful head that Guido ever painted. In the face there is an expression of the most intense grief, together with calm resignation, that it is possible to imagine or portray. You may be of opinion, and rightly so, that much of this expression is due to the fervid, upward straining of the eyes. But, to my mind, the chief source, the well-spring of expression, is to be found in the exquisite mouth—a mouth that trembles with suppressed emotion, and lips that seem to be breathing with prayer. It is difficult to analyse or explain the cause of the subtle expression about this mouth. Let the student look closely, he will see with what loving care the artist has painted this feature. The superior incisor teeth can all be traced, and just seen below the margin of the upper lip, and this so skilfully managed that they in

no way obtrude themselves upon the notice, but are blended and lost into one beautiful harmony with the rest of the face.

Close to this picture, and in the same room, hangs another by the same painter (No. 271). It is the world-famed *Ecce Homo*. This picture bears out, perhaps to a still greater degree, the amount of feeling that can be expressed by the mouth. Here the immortal anguish of a great spirit is depicted with a tragic truth and power that no other painter since Guido has so successfully rendered. In this picture, the mouth is slightly open, the tongue depressed, the teeth just visible above the margin of the lower lip, which is drawn down from them, as it often is in nature, in the expression of extreme suffering. Then the great depth of feeling expressed by the whole face. It is wonderful! One can almost hear from those lips that last appealing cry on Mount Calvary!

I bring these examples prominently before your notice, because they, more than any others I can call to mind, bear me out when I say that the facial expression of sentiment and passion in nature, consequently in art, is dependent in so great a degree upon the mouth and lower part of the face.

I might mention another pictorial example which well illustrates the direct influence that the mouth has upon expression. The picture this time is in the collection at Hampton Court Palace. It hangs in the King's writing closet, in a rather obscure corner, and, I fear, is too often overlooked. It is a portrait of the ill-fated Lucretia, by Paris Bordone, and is a face of singular grace and charm. The eyes, by their peculiar haunting look, are answerable for a great deal of the effect, but, it is nevertheless evident, that the *pathos* of this head has its origin in the mouth and the *expression* which it has been treated by the artist.

To make this more obvious, let the observer, standing at a little distance from the picture, place his hand so as to obstruct the view of the mouth, and he will see what a loss to the beautiful effect the work sustains.

Our annual art exhibitions will always be found to afford examples in this connection worthy of the close attention of the dental student, and I would advise all of you who visit the present exhibition of the Royal Academy to notice, with a little more than ordinary attention, how our best figure and portrait painters bestow their greatest art and care in their treatment of the mouth.

As still one more instance of the great influence that the mouth has in art, I will narrate the following personal experience:—

Some few years ago I was in Paris, with the intention of studying art, and was engaged in copying a picture in one of the galleries of the Louvre. It was the head of a beautiful woman, by, I think, an unknown painter. Besides being a work of most exquisite execution and design, it was somewhat celebrated for the difficulties it presented to the copyist.

I had passed many a weary day in painting and re-painting my copy, each attempt, however, only convincing me the more that my work was anything but satisfactory. It was puzzling, for I had copied other pictures of more *apparent* difficulty than this upon which I had seldom spent so much time and labour. What, then, was the cause of this absence in my work of the life and expression of the original? Vainly had I asked myself this question for the hundredth time.

A neighbouring copyist—a veteran in art, well-known to the *habitués* of the gallery, had been for some time silently observing my distress with evident satisfaction. At last, taking compassion upon me, he came up to my easel, and remarked very politely—with that peculiar politeness that only a Frenchman can assume—“Monsieur is trying to copy that picture? The woman there with the *lovely mouth*. Will Monsieur be advised? He might as well try to re-produce that ray of sunshine yonder as to make a good copy of that face. Me! I have worked here for over thirty years and have made many copies of that picture, but have never been satisfied with any one of them. But I have discovered what it is, Monsieur? It is the mouth; it is the mouth. *C'est la bouche, Monsieur; c'est la bouche!*” The old man was right, although perhaps a little exaggerative. I immediately became convinced of the truth of what he said, however, and saw too, for the first time, with what subtlety of expression the artist had invested the mouth.

Thenceforward, I think my observation of the human mouth became more precise and analytical. Circumstances at that period were tending to make dentistry my vocation. The lesson was therefore opportune, although at the time dispiriting.

I could see the great advantage to the dentist that a knowledge and appreciation of form and expression must have, especially in his operations upon that feature, for the beautifying or marring of

which he must be content to be held, in a great measure, responsible.

The dental student should be ever on the alert to perceive and discover those endless varieties and plays of expression that are to be found about the mouth.

The theatre offers an excellent field for studying it, in its expression of passion and sentiment. It is here, though, that the student will have to be careful to discriminate the false from the true. We have only a very few actors whose genius is such as to enable them to truthfully feign those outward signs of the inner emotions. In almost any assembly, in fact, at which the dental student may happen to be, he may watch the ever-varying shades of expression and action of the lips in conversation.

Let him take particular note of the appearance of the teeth in animated conversation; how, when visible, their lines and colour harmonise with those of the face. How the colour and lines of the lips, too, may form a pleasant contrast to, or assist in heightening, the beauty and colour of the teeth, and how slight irregularities in the arrangement or position of the natural teeth seem so to suit the countenance, that one would think it was a premeditated design of nature thus to arrange them. He will, too often I regret to say, discover some discordant and diabolical dental disfigurement in the course of his observations. This will be the handiwork, doubtless, of one of his qualified (?) *confrères*, which he may turn to good account by mentally remedying or analysing the deformity.

In short, wherever the student turns, if observant, he will find plenty of subject ready to hand, and provided only he be blessed with discretion, and do not give offence by becoming too closely scrutinous, he may make his mental notes with all possible ease and security.

I offer the foregoing as a caution, and advisedly, for this reason—

It will be chiefly from amongst the fair sex that the student will select his subjects for observation and study. The mouth of man, unless the face is clean shaven, is not so easily to be seen in action, nor when seen, is it so mobile or sensitive in expression as is that of woman.

I have hitherto been treating my subject in its broad aspect only—as it concerns the expression of emotion and beauty. This,

as I explained in the opening of my paper, it was my intention only to do, but I think I may venture just to read a few notes regarding the arrangement of the teeth in nature.

These notes are extracted from many others which I have made at different times, for my own guidance, in adapting teeth artificially to the mouth.

The incisor teeth are those we have, of course, principally to deal with as regards expression, although the buccal teeth at times play no small part.

In the first place, the central incisors call for the greatest care in their arrangement. It requires the nicest judgment to place them so as not to make them too pronounced. It is hardly ever safe to make these teeth overlap in those cases where the face seems to demand a general prominence of all the incisors. Unless the upper teeth take an inward inclination, it is better to let the central incisor teeth simply approximate. I find that the overlapping or prominent central teeth give to many faces an inquisitive and inquiring look, which is not in all cases a suitable expression. I have, however, found the overlapping central teeth (without the undue prominence, to be markedly present in persons of a commanding and determined character. But in these instances there is a corresponding firmness of all the lines of the mouth and lips, and the teeth are seldom if ever disclosed.

With the lateral incisor teeth, a little more liberty may be indulged in. I have noticed that the overlapping or prominent lateral tooth, when present, is generally in persons of capacity and intelligence, and that it really does give a look of intelligence to the face, if allowed to stand a little in front of the other teeth. This especially so when both lateral teeth take that peculiar curved inclination towards each other over the central incisors.

The canine tooth is, perhaps, the most important of all, and the most difficult to deal with in point of expression. It can be made to modify or give emphasis to the character of the whole face. Let it be a little too long and prominent, it will give a ferocious, sensual and animal-like expression. Place it back in a certain position, it can be made to subdue, at the same time influence or control, all the other teeth. I sometimes consider it needful to suppress altogether this tooth when applying artificial dentures. This usually in female patients of delicate, *spirituelle* expression and features.

Where all the teeth are too much visible, or unduly prominent, the face partakes of a mean expression. This especially so when co-existent with a generally mean and undignified cast of features. There are persons, however, either of tall stature or massive, pronounced features, where this prominence of the teeth does not seem out of place, and in these cases there will nearly always be found a corresponding and suitable disarrangement of the teeth.

Just as much as some of these dental arrangements I have noted may add dignity or force to the expression, so may badly-arranged, puny, or inter-spacial teeth, when visible, give to the face a weak, hesitating character, and will generally be found to be co-existent in nature with individuals of this description.

With regard to the size of the teeth, when replacing them artificially, I think it safest to adopt the plan of supplying small teeth to persons of small size and stature, and *vice versa*. As a general rule it will be found that nature carries out this system, and the teeth she supplies commonly correspond proportionately in size and development to the individual.

I do not wish it to be thought that I advocate the general or indiscriminate disarrangement of the dental organs with a view to its effect upon facial expression. Nature does not do this, and we see many mouths in which the teeth are placed in their regular normal order, to disturb or break the harmony of which would be to mar the beauty of the whole face.

What I wish to impress upon you is, that the teeth in nature do not by any means conform to one fixed principle in their relative positions, and that we owe it to those who place themselves in our hands for dental reconstruction to study for each individual case the most suitable, natural, and harmonious conformation of the teeth; and with a view to increasing, not to lessen, any beauty that the face may possess. This can only be attained, as I have before pointed out, by constant observation and record. Whenever you notice amongst your patients a mouth that strikes you as possessing any particular interest either for its beauty of arrangement or form, take a cast to keep for reference. This is an advantage that our profession can claim over almost any other artistic calling—this being able with such ease to obtain direct reproductions from nature for our use as models and guides. In conjunction with this also, it is well to make notes of the appearance or prevailing expression—the type,

complexion, and other salient points of the face from which your cast of the mouth is taken.

It is sometimes almost startling to find what an amount of individuality there is about the mouth. I can distinguish many of my cases and my patient's names by simply looking at these plaster models, and, where the conformation is particularly striking or peculiar, after almost any length of time. Thus, I rarely find it necessary to number or name my casts.

No doubt many of you have also remarked this resemblance of the models of a mouth (especially when placed in articulation) to the expression of the whole face of the patient. And it is caused in this way: The mouth, as I have been endeavouring to show, is one of the most salient and powerful means of expression. The casts taken from it, therefore, and viewed in the manner I have described, although separated from the surrounding features, will call up in the mind the image of and, indeed, the characteristics of the countenance to which it forms a part. This of itself, I think, should be a proof, if proof be needed, of the important and overpowering part that the mouth plays in the general facial expression. No other feature, viewed under similar circumstances, would suggest to the mind of the observer, to so potent a degree, the rest of the face to which it belongs.

Before concluding, it was my intention to have said a few words upon the mechanism or the muscular means by which all facial expression is brought about. To do this at all adequately would take up more of your time than I feel justified in appropriating. I will just, however, quote one or two passages from a work that should be in the possession of every dental student, viz., "The Anatomy and Philosophy of Expression," by the late Sir Charles Bell. In dealing with the muscles that influence the mouth chiefly in expression, the author says:—

"The character of human expression in the mouth is given by the *triangularis oris* or *depressor anguli oris*, a muscle which I have not found in any of the lower animals.

"I believe it to be peculiar to man, and I can assign no other use for it than that which belongs to expression. It arises from the base of the lower jaw, and passes up to be inserted with the converging fibres of all the muscles of the side of the face into the corner of the mouth; it produces that arching of the lip so expressive of contempt, hatred, jealousy; and in combination with

the elevator of the under lip or *superbus*, and the *orbicularis*, it has a larger share than any other muscle in producing the infinite variety of motions in the mouth expressive of sentiment In man, the actions of the frontal muscle of the *corrugator supercilii*, and of the orbicular muscle of the mouth, give much expression.

"If, instead of the retraction of the lips and the exposure of the teeth, as in the rage or pain of animals, the mouth is half closed, the lips inflected by the circular fibres, and drawn down by the action of the peculiarly human muscle, the *depressor anguli oris*, then there is expressed more agony of mind than of mere bodily suffering, by a combination of muscular actions of which animals are incapable.

"The action of the orbicular muscle of the lips is, indeed, the most characteristic of agony of mind, and of all those passions which partake of sentiment; in grief, in vexation of spirit, in weeping, it modifies the effect of the muscles of animal expression, and produces human character. . . . In the emotions of contempt, pride, suspicion, and jealousy, the orbicular muscle and the *triangularis oris* produce by their combination the arching of the lips, and the depression of the angle of the mouth. The horizontal drawing of the lips, which just discloses the teeth, and betrays the severe or bitter and malignant passions, is owing to a more general action of the muscles overcoming the opposition of the *orbicularis*."

The work from which I have made the foregoing extracts is considered a standard one amongst artists; but the dental student, I am convinced, will also find much in its pages of the greatest interest and value. It is a volume that should find a place in the library of every dentist.

In conclusion, I wish to embrace this opportunity of expressing the hope that we may, at no distant day, see the establishment of a chair of dental *æsthetics* in this College. I feel confident that such an addition to our already excellent teaching staff would be productive of much good. It may be averred that the subject I urge could well be, or is already, included in the syllabus of the lectures on dental mechanics. I maintain, however, that it would be impossible to do sufficient justice to this important study to thus include it within the necessarily confined limits of teaching so purely practical and mechanical.

The subject I have so inadequately brought before your notice this evening is one that must be regarded and treated from the broadest point of view. It must, whilst not losing sight of the practical nature of the dentist's calling, be directed towards his higher nature. It must aim at enlisting the sympathies of the student with those nobler ends of all art, which is, the mental elevation firstly of those who pursue it, afterwards leading on towards the desire to accomplish good and beautiful work; the end of which is not so much the mere pecuniary reward that must follow in its train, but the knowledge of having conscientiously performed, with nature for an authority and guide, work that will withstand the searching light of æsthetic criticism.

NATIONAL DENTAL COLLEGE.

DISTRIBUTION OF PRIZES.

THE Annual Distribution of Prizes to the successful students for the past year, took place at the Freemasons' Tavern, on June 8th, Mr. Thomas Arnold Rogers presenting the prizes.

Dancing began at 8 o'clock, and at 9.30 there was an interval of half-an-hour, when, the company having adjourned to another room, the Dean read the following report:—

The "Pass List" of the year includes the names of seven of our students; five have taken the L.D.S., while Mr. Lancaster has obtained the L.R.C.P. and M.R.C.S., and Mr. James Rymer the M.R.C.S.

Whilst, on the one hand, we are qualifying men to practise their profession, we have, on the other, to record vacancies caused by death. On September 28th, Henry T. K. Kempton passed away at the age of 66 years. He was the first Dean of the Metropolitan School of Dental Science; he was also one of the founders, and for many years Dental Surgeon, &c., to the National Dental Hospital. On February 12th, one of our late students, Charles Rose, was removed from the scene of earthly toil at the age of 28 years. In 1882 and 1883 he was successful in gaining three certificates of honour and three prize medals, including the Rymer Gold Medal for General Proficiency.

The following is the list of prizemen:—*Rymer Gold Medal for general proficiency*, Mr. T. S. Minett. *Dental Surgery:—Prize*, Mr. T. S. Minett; *Certificate of Honour*, Mr. A. S. Jones and Mr. S. D. Timms. *Dental Anatomy:—Prize*, Mr. T. S. Minett; *Certificate of*

Honour, Mr. W. Rushton. *Operative Dental Surgery*:—Prize, Mr. T. S. Minett; *Certificate of Honour*, Mr. W. Rushton. *Dental Mechanics*:—Prize, Mr. C. A. Clark; *Certificate of Honour*, Mr. C. P. Phillips. *Metallurgy*:—Prize, Mr. W. Rushton; *Certificate of Honour*, Mr. T. S. Minett. *Dental Materia Medica*:—Prize, Mr. W. Rushton; *Certificate of Honour*, Mr. A. S. Jones. *Students' Society prize for the best paper read during the year*, Mr. A. S. Jones.

Mr. W. Lapraik, of the Chemical Laboratory of St. Bartholomew's Medical College, has been appointed to the Chair of Metallurgy, rendered vacant by the death of Mr. Alfred Tribe.

A not unimportant regulation was adopted early in this year by the Medical Committee. That was the decision to admit to the opportunities and teaching of this school female medical students. Those ladies, when qualified as medical practitioners, mostly go out to India to labour among the female population of that vast country. It was felt that in this sphere of work some knowledge of the dental surgery of the present day would be of great use to them and of undoubted benefit to their patients. That knowledge could be best gained at a Dental Hospital, and the Committee in this instance, as in other cases, placed facilities in the way of advancing the knowledge of dental science.

The prizes having been distributed, Mr. THOMAS A. ROGERS made the following remarks:—

It is, I believe, customary on these occasions to say a few words from the chair, and I congratulate you on having a Chairman this evening who is such a very indifferent speaker that you will not be detained long from the enjoyment of the pleasant programme which I hold in my hand.

But I *must* express the pleasure which I feel in presiding here to-night. Many of the gentlemen who compose the staff of this Hospital were, a few years ago, members of what was called my "flock" in the sweet pastures of Leicester Square, and it is very pleasant to find them with their own flocks gathered round them, in "pastures new." Perhaps Mr. H. Weiss may yet remember the races he and I used to run to get first to the summer morning lectures. I think he will acknowledge that, although I had farther to go, I was generally first. Unluckily for me there was no good conduct prize.

While I am telling tales out of school, I will refer, though with

bated breath, to another incident with which one of the most esteemed and energetic of your members was concerned. During my deanship, my attention was directed to some unpunctuality in attendance on the part of one of the students, and I was called upon to interview him. Could I have foreseen that this young student would in time himself become a dean, my limbs would perhaps have trembled under me, and my lips have refused their office. Well, I will only add that Mr. Gaddes' explanation showed that he had to contend with considerable difficulties, and that, so far from meriting blame, he deserved credit. I am sorry I cannot remember any more anecdotes at this moment, and I don't want to make the rest of the staff uncomfortable.

We are assembled here this evening to show honour to the prize winners of the last summer and winter sessions, and from what I hear they fully deserve all the honour we can show them. You will notice in the programme that Mr. Minett's name appears five times—a splendid record. Mr. Rushton seems to have run Mr. Minett rather hard with four notices. Mr. Jones appears three times, and he also did extremely well last year. Mr. Timms once, and he did well last year, and I am told very nearly reached still higher honours. Mr. Phillips once, and he also made a good record last year, and Mr. Clark once. You will observe that Mr. Jones, Mr. Timms and Mr. Phillips did well two years running, and those who have had experience in such matters know that this generally means good sound steady work. And I feel sure that not only will they always value the material evidences of their victories which they will bear away with them, but that their success here and the just pride engenders will aid them in upholding the standard and social conduct, which after all are the same thing, through their future life. Who ever heard of a prizeman doing anything unworthy. And while our prize winners are enjoying their triumph and the congratulations of their friends, I am sure they will forgive me if I now say a few words to those who have not succeeded this time.

But I must first allude to the interesting innovation of the admission of lady students. Let us wish them every success. I do not see their names on the prize list this year. Doubtless they have been content up to the present time with winning the hearts of all with whom they have come in contact. But I warn you

they will not be satisfied with *that* very long. They are very ambitious. I have had the pleasure of knowing several medical ladies.

Well, I should like to say to those gentlemen who, having striven, have not won the race this time, that although they may not have gained prizes, yet their efforts have by no means been thrown away. It has indeed been remarked that they are not always the prizemen whose after careers are the most brilliant. It does sometimes happen that those who have not specially distinguished themselves in their hospital course are yet most successful practitioners. How is this? There must be some reason for it. What is it? Well, success has its dangers, and failure has its gains. The danger of success lies in mistaking the means for the end, in imagining that the goal is won at once and for ever and with no need for further effort. The gain of failure is the better knowledge of ourselves, of our deficiencies and disadvantages, and in the firm and unconquerable determination to succeed in spite of them. Let no one go away despairing because he has failed in this competition; rather let him study the causes of his failure, and brace himself up for instant and renewed and increased effort. That is the man whose name will probably henceforth be prominent both here and in the wider sphere of work when he leaves here. And to both winners and losers I would say, trust always in *continuous* effort; do not work spasmodically, by fits and starts. Inspiration is the fitting mood for poets, for composers, for painters, but patient and thoughtful labour is necessary for all who would venture to explore the mysteries of health and disease, of life and death.

Mr. S. LEE RYMER, J.P., thanked Mr. T. A. Rogers for presiding. He said the prizes would be doubly valued on being received from such hands. The Committee had been very successful hitherto in having distinguished gentlemen to distribute the prizes; but he felt that they were never more successful than in obtaining the kind services of Mr. Thomas Arnold Rogers, who was the son of a distinguished father, and was highly esteemed by the profession.

This part of the ceremony having been concluded, dancing was resumed until 12 o'clock. The evening was in every way a success and very enjoyable.

THE AMERICAN MEDICAL ASSOCIATION AND DENTISTS.

At the Annual Meeting of this Association, which was held in Chicago and adjourned on June 10th, it was resolved, That the regular graduates of such dental and oral schools and colleges as require of their students a standard of preliminary or general education, and a term of professional study equal to the best class of the medical colleges of this country, and embrace in their curriculum all the fundamental branches of medicine, differing chiefly by substituting practical and clinical instruction in dental and oral medicine and surgery, in place of practical and clinical instruction in general medicine and surgery, be recognised as members of the regular profession of medicine, and eligible to membership in this association, on the same conditions and subject to the same regulations as other members.

Dr. DAVIS, in introducing the resolution, said there were two objects in view; first, to relieve a degree of embarrassment that existed between the regular profession and the profession of dentistry. The department of dental and oral surgery was a part of the profession of medicine as much as the department of ophthalmology or of otology. There is an embarrassment in this respect: it is to know just who and by what line of demarcation those engaged in that department shall be recognised as members of the regular profession. Now it is proposed to make a line and draw it where this resolution says, that all those who are qualified by general education and a term of study equal to the best medical colleges—a curriculum embracing the entire fundamental principles of medicine, with the provision that, in clinical surgery, instruction may be had in dental and oral surgery—such shall be recognised as members of the profession of medicine. It will take away that sort of embarrassment. There is a more far-reaching and more valuable underlying object in this resolution, and that is, that to be recognised as members of the profession, if this resolution is adopted by this body, they must have the education received in schools that provide these requirements; and it thus makes a strong lever to lift up the course of study in the dental schools.

The resolution was carried unanimously.

M. PASTEUR'S TREATMENT OF HYDROPHOBIA.

IN April, 1886, a Committee was appointed by the Government to enquire into the Pasteurian system of inoculation as a remedy against hydrophobia. The Committee consisted of Sir James Paget (chairman), Dr. Lauder Brunton, Dr. George Fleming, Sir Joseph Lister, Dr. Quain, Sir Henry Roscoe, Professor Burdon Sanderson, and Professor Victor Horsley (secretary). The report, which was unanimous and has just been issued, states that the "protection from rabies by subcutaneous inoculation is proved by the fact that, if some animals thus protected and others not thus protected be bitten by the same rabid dog, none of the first set will die of rabies, and, with rare exceptions, all of the second set will so die. It may hence be deemed certain that M. Pasteur has discovered a method of protection from rabies comparable with that which vaccination affords against infection from small-pox. It would be difficult to over-estimate the importance of the discovery, whether for its practical utility or for its application in general pathology. It shows a new method of inoculation, or, as M. Pasteur sometimes calls it, of vaccination, the like of which it may become possible to employ for protection of both men and domestic animals against others of the most intense kinds of virus."

"From the evidence of facts, we think it certain that the inoculations practised by M. Pasteur on persons bitten by rabid animals have prevented the occurrence of hydrophobia in a large proportion of those who, if they had not been so inoculated, would have died of that disease. And we believe that the value of his discovery will be found much greater than can be estimated by its present utility, for it shows that it may become possible to avert by inoculation, even after infection, other diseases besides hydrophobia. M. Pasteur's may justly be deemed the first proved method of overtaking and suppressing by inoculation a process of specific infection. His researches have also added very largely to the knowledge of the pathology of hydrophobia, and have supplied what is of the highest practical value, namely, a sure means of determining whether an animal, which has died under suspicion of rabies, were really affected with that disease or not."

RESTORATION OF A NAME TO THE DENTISTS' REGISTER.

REG. v. THE GENERAL MEDICAL COUNCIL.

THIS was an application to the Court of Queen's Bench (Mr. Justice Mathew and Mr. Justice Smith) for a *mandamus* directing the Registrar of the General Medical Council to restore to the Dentists' Register the name of Henry Francis Partridge, which had been removed by order of the Council. Mr. Partridge was in practice as a dentist before the passing of the Dentists' Act, 1878, and on that account entitled to registration at the formation of the Dentists' Register. He did not claim registration on that ground, but did so in virtue of a qualification—L.D.S.I. 1878—and was registered accordingly. On obtaining the diploma, *sine curriculo*, from the R.C.S.I., he signed a declaration that he would not advertise, nor pursue any other unbecoming mode of attracting business, or the diploma should be cancelled. The College considered that Mr. Partridge had contravened that declaration, and, in 1885, removed his name from the College roll. In due course the Medical Council had, of necessity, to remove that qualification from the Dentists' Register, and in so doing the name was left without any "Description and Date of Qualification," and therefore without any claim to registration. Consequently the Council, after an adjourned consideration of the matter, erased the name from the Register.

Mr. Partridge now moved for a *mandamus*. The case having been argued on May 19th, Mr. Justice Mathew, on June 15th, delivered the judgment of the Court. His Lordship said the applicant had, since 1867, practised in the metropolis as a dentist admitted that when the Act passed he would have been entitled to be registered as a dentist if an application had been made by him in accordance with the provisions of Section 7. He had not, however, applied for registration in respect of this qualification. In 1878 he obtained from the Royal College of Surgeons, Ireland, a diploma in dentistry, and as a licentiate of this body, which was one of the medical authorities referred to in the Act, he applied for and procured registration under the statute (Section 6). The diploma had been granted on the terms that the holder should not seek to attract business by advertising or by any practice considered by the College unbecoming, and that the diploma might be cancelled on its being proved to the satisfaction of the President and Council that he had done so. In the year 1883 the Royal College of Surgeons of Ireland,

upon the ground that Mr. Partridge had advertised for business, cancelled his diploma, and thereupon the General Council directed his name to be erased from the Register. Section 11 contains provisions as to the corrections to be made from time to time in the Register, and it was argued for the General Council that, where the original qualification no longer existed, the Council were bound to correct the Register and erase the name. It was argued for the applicant that the name of a person qualified either by practice or diploma, and once properly placed on the Register, could only be erased in the manner and upon the grounds specified in the statute. It was urged that the mere fact that the diploma had been cancelled by the medical authority which had granted it was not a ground upon which the General Council was justified in disqualifying the applicant or exposing him to the penalties imposed by the Act upon unqualified practitioners. We are of opinion that the contention of the applicant is right, and that he is entitled to have his name restored. It appears to us that, in such a case as the present, the Medical Council possessed no further powers of dealing with the Register than those conferred in the sections referred to. It was admitted that the Council had not decided that Mr. Partridge had done anything to justify the removal of his name under Section 13, but had considered that they were bound to erase his name when the determination of the medical authority granting the diploma had come to their knowledge. This is a course which, it seems to us, they were not entitled to adopt, otherwise where a medical authority has withdrawn a diploma on the ground, for instance, that a particular theory of dental surgery had been proved to be false, the name of the holder must be struck from the register. But this is a ground upon which the General Council under Section 13 are expressly prohibited from erasing a name. The third clause of Section 13 appears to show that the Council was not intended to be bound by any determination of the medical authority, even with respect to the grounds for erasing a name specified in Section 13, but was required to adjudicate independently. This view is strengthened by an examination of the provisions in the last clauses of Sections 13 and 14. The Act appears to be carefully framed to restrict the right of the General Council to interfere with registered dental practitioners in the practice of their profession to the cases where there are the grave reasons for disqualification specified in Section 13.

The rule for a *mandamus* was accordingly made absolute, but, on an application on behalf of the Council, was ordered not to be drawn up for a week. The case will be carried to the Court of Appeal.

THE ODONTOLOGICAL SOCIETY.

THE usual monthly meeting of the Odontological Society was held at 40, Leicester Square, on June 6th, the PRESIDENT, Mr. C. S. Tomes, F.R.S., in the chair.

Dr. Dudley Buxton and Mr. J. Bland Sutton were unanimously elected honorary members of the Society.

Mr. HENRI WEISS mentioned a case of an alveolar abscess on the left side of the lower jaw, which occupied the place of the growing tooth and was thrown to the surface, where it was found lying like a deciduous tooth.

Mr. ACKERY mentioned a similar case; both roots of the temporary molar and second bicuspid were present on the surface of the gum, evidently the result of alveolar abscess.

Mr. STOKER BENNETT showed a model of the mouth of a child in which the second bicuspid was inverted.

Mr. S. J. HUTCHINSON showed the Welsboch incandescent gas-light which, he said, contrasted favourably with the albo-carbon light, consumed no more gas than the ordinary argand burner, gave a perfectly white light and very little heat.

Professor VICTOR HORSLEY then read a paper on

EPILEPTIFORM NEURALGIA OF THE FIFTH NERVE.

He said: It is not my intention to weary you with details of cases of neuralgia that I have treated by operation, but I wish to bring before you certain points of interest in these cases, and more especially points in regard to diagnosis, points upon which I myself desire much information; for these cases, as you may well imagine, have only come into my hands at a very late period after the onset of the mischief, the earliest $3\frac{1}{2}$ years after the pain had made itself very obvious, and the latest 7 years after. In each of the cases, after the operation, there has been only one story—gratification at the relief from pain, and regret at the loss of sound and useful teeth. Of course it is on this latter point that I hope to-night to have the benefit of your wide experience given me. If we can diagnose the exact conditions under which the most

inveterate form of neuralgia arises, we shall, I think, make one step forward in the right direction.

Now, if a patient comes to us and complains of infra-orbital pain, I take it we first put to ourselves the question whether the pain is caused by mischief of a central origin, and if of a peripheral origin, whether the disease is in the trunk of the nerve or in the teeth. It is not necessary for me to do more than mention the possibility of its being occasioned by intra-cranial disease. I think the general rules for the detection of intra-cranial disease suffice for its diagnosis. The remaining question, then, is whether it is possible to diagnose affections of the trunks of nerves from disease of their terminations?

Perhaps if I just mention to you the principal points in the cases which I have treated, two of whom are in the next room, it will serve as a direction to us. The first case is a man aged 60, who suffered for seven years before I saw him. All the branches of the nerves were affected, but it was clear that the middle division of the fifth nerve was the starting point. The pain he felt and referred to was located in the centre of the malar bone, and from that point radiated all over the branches of the left fifth nerve. I operated on the infra-orbital nerve, and I was convinced by means of the electric light that I had removed the whole of the nerve from the foramen rotundum, but although he was relieved, the pain recurred in a few days in the palate. To make sure I cut down upon the palate at the hinder part of the alveolar border, and that operation was followed by complete relief of pain for some time. But then the pain recurred in the inferior dental nerve. I performed an operation for removing a considerable piece of the inferior dental nerve. I believe that this is a secured success. It will not be sufficient for us to destroy only a part of the nerve unless we destroy the whole of that part. Now, the operation I suggest for reaching the nerve below the foramen ovale seems to me a simpler one than has been suggested recently, within the last two months, by Albrecht, of Vienna. Albrecht proposed to cut down from the zygomatic arch; but you can get at the nerve perfectly well by exposing the masseter, trephining the lower jaw, and cutting upwards into the sigmoid notch with the bone forceps, and following upon the nerve, you can trace it up to the foramen ovale. I performed this operation upon the patient about twelve months ago, and he had complete relief until

this last week, he tells me he had a twinge in the palate. Whether it is going to be the usual slight recurrence I cannot say. However, he has had more than a year of complete relief.

Well, then, the next patient was also a man, aged 65. I simply performed the operation for removing the middle division. This was followed by complete relief. He remains cured so far; that was done about three months ago.

The next case is that of a matron of an infirmary who had suffered for three and a-half years; she also is relieved.

In the last case, I performed the operation a few weeks ago. It was the worst case I have ever seen. The patient, a lady, for a fortnight had not been able to feed by the mouth at all, she suffered intense pain, and the parts were a great deal swollen and glazed. The operation was of the severest kind. Although the pain was intense in the fifth nerve, it was radiated to the other branches.

Well, these are briefly the details of the cases upon which I now propose to dwell for a few moments.

I think, for the purpose of fixing the points or the problem before us, we had better consider for a moment the anatomy of the mixed nerve as a whole, and consider the question on a broad basis.

In the first place we must admit that whatever may be the ultimate physiological explanation, there must be fibres which, if damaged, disease will occur.

Next we have fibres of common sensation going to the skin. Next we have fibres going to the vessels; and lastly, we have fibres of special sensation—in these cases of course terminating in the teeth. Then mixed nerves—in fact, so far as we know, all nerves—are provided with nerves of common sensation, that is to say, there are end organs which give the trunk of the nerve common sensation. This fact is a comparatively novel one. The stem upon which the observations are based is shown here; it explains pathologically the occurrence of great pain in the periphery.

The problem for us to-night is whether we can diagnose between the inflammation of this portion of the nerve and of terminal portions. Here is the point upon which I must crave your charity, because, as I said just now, I have no experience in the initial stages of the trouble, and it is upon this special point that I ask for information. But, speaking from the other point o

view, of cases as I have seen them myself, it occurred to me to ask whether we could not attempt to diagnose much in this fashion :— If the mischief affects the termination of the nerve, it will be clear that there can be no changes in the other portions of the body supplied from the other branches of that nerve, except by reflex action through the whole system, that is to say, we could not expect to get any wasting in the face by neuralgia commencing only in the teeth, or if we had, it would be very slight. If, on the other hand, you had mischief in the trunk itself, it is obvious the converse ought to be true, viz., that the trophic changes ought to be very marked. Well, I believe that is the case, that these are not accompanied by any changes through reflex mechanism. Now, what are the changes? I spoke of wasting, but there are more minute pathological changes. The patient I quoted to you as having been operated on last presented these changes in the most marked degree I have ever seen : the lower lip was greatly swollen and excessively sensitive, and the skin glazy and shiny. The same thing was noticed by Mr. Walsham in his account of two cases of the same kind. Of course one notices that the vessels may sometimes be dilated, or at others just the opposite.

Well, now, as to common sensation, it is perfectly true, as in an ordinary case of toothache you may observe, that the pain radiates not only from the parts affected but to all the branches of the fifth nerve, but I do not think it has ever been observed that there have been changes in the skin. What I would point out is this, supposing that we are dealing with pain in the upper canines ; supposing, again, that pain not to be complicated with any causes, I am not aware of cases being recorded in which the patient was hyperæsthetic or anæsthetic at a distance so far as I know. Well, this is the case when the disease is in the extreme trunk of the nerve.

Sometimes you get a case in which, if you gently rub something over the skin, it gives extreme pain, whereas, if you press it tightly there is no pain at all ; that is well known, but it has never met with any explanation. That is a very striking form of hyperæsthesia, and it is one which I believe is only connected with those cases where the disease is in the trunk of the nerve.

Lastly we come to nerves of special sensation. In the case of teeth, of course we have hyperæsthesia in varying degrees. I would ask for information on the point, whether in those cases

where pain is distinctly removed by extraction of the teeth, and then observed to recur in the next tooth, whether there was any difference in the patient's feelings; I mean to say, was it an exact repetition of the original feeling, first, when the tooth is pressed upon, beginning slightly and becoming intense, did the whole process go through the next tooth? Because, *à priori*, it would follow that you are dealing with a case of local affection, and perhaps it would be good policy to go on extracting. But, as I say, that is one point upon which I desire very greatly to be informed.

Well, now, suppose we take up the character of the pain itself and analyse it as a means of diagnosing these two conditions slightly more closely. Well, I think one generalization should be considered, viz., the place or origin of the pain—where did the pain first arise?

In the first case I told you of the pain began in the bone. I find in the majority of cases the patient says it begins in the teeth, they also have it in the bone and also in the skin; of course observations of this kind are calculated to help. If the patient states distinctly that the pain begins in the bone, and from there goes to the teeth, it should tell us that the origin is in the trunk of the nerve, and that after extracting one or two teeth we should stop and go to the trunk of the nerve.

Then, again, if the pain commences very distinctly in the skin, and subsequently only affects the teeth, it would point to the mischief beginning in the trunk. Finally, if it is referred by the patient to the teeth, it might begin there, but it might not. It may be only a question of referring the pain wrongly, just in the same way that we refer pain to the little finger when it comes from the elbow. Then comes the next point, the *mode* of its origin. I suppose it is within the experience of all here that it is impossible always to find from the patient what was the original cause of the mischief. One will say it is a bad tooth, another mental worry, another cold, another injury, and so on. I have not been able to find out any common mode of origin. But, there again, my experience as a surgeon is extremely limited, and on this point I desire further information, but I may say, if the pain occurs gradually, and there are teeth in the neighbourhood of the seat of the origin of the pain as described by the patient, well then, I suppose we may say the teeth are the primary source of the

mischief. If the pain occurs suddenly we may say it is in the trunk.

Well, we take another generalization concerning the pain and discuss its character. If it is of a constant character, it would seem to have in most cases a peripheral origin; if it is intermittent, it would seem to be in the trunk; but in a very severe case you may get these points confused. In the last case I quoted, the pain was distinctly intermittent. There were periods of complete relief from neuralgic pain.

Now, fourthly, with regard to excitant causes. Can pain be brought on—in other words, what is the cause of pain? If you find that pain is brought on most commonly by movement, it would seem to be characteristic of affection of the trunk of the nerve. The patients all state that movement of the jaw brings on pain; in fact, on one occasion I secured rest to a patient by tying up the jaw. It is perfectly obvious to any of us that the inferior dental nerve is pulled upon in opening the jaw to eat or speak, and this possibly will bring on pain. I am not aware that the same importance is to be attached to movement in ordinary dental irritation.

Well, as to the question whether different re-agents excite it or not, I think we can gain very little information. The same patient will tell you that cold brings it on, and another day that heat does so, so that there is no hard and fast line to be laid down on that point.

Fifthly, I think the extent of the pain is one of the most important points. If, in addition to the fact that you have severe pain in the distribution of the nerve you have distinctly tender spots along the branches of the nerve, you have an indication that the whole nerve is in a state of hyperæsthesia, and the pain is primarily due to inflammation.

Finally, gentlemen, a few remarks concerning treatment. I have endeavoured to lay before you very briefly and sketchily the outlines upon which we can discuss the origin of the pain, which is a practical matter to be dealt with. Now, as regards treatment in those cases in which extraction has not been proved to be of final service. All those cases I have treated by drugs, such as opium (of which, in one case, I gave 30 grs. a day, and in another 23 grs. a day), &c. All these narcotics have ultimately failed: they have relieved the pain for a time, but then made it much worse. The

very small experience I have had has shown me that croton-chloral produced more effect than any other drug taken internally. Then, with regard to local administration, we have seen various injections hypodermically made. Cocaine always seems to fail, and necessarily the introduction of the needle brings on a paroxysm of pain. Large doses of morphia may be given without any relief of pain. Some patients say it makes the pain worse. There seems to be some action on the nerve tissues which is not altogether favourable.

With regard to surgical treatment of the nerve, there is no doubt that nerve stretching should not be performed upon the branches of the fifth nerve, because it involves just as many risks as cutting out the nerve, and the pain invariably recurs. Neurectomy, on the other hand, is generally successful. As to details in carrying out surgical treatment, of course I must not occupy your time here, but allow me to say, from seeing the operation performed under different circumstances, that I do believe that success is due to the efforts one makes to obtain primary union—this always supposing that the whole nerve, or considerable portion of the whole nerve, has been completely removed.

Lastly, as regards the effect of neurectomy—the general effect on the parts and the general effect on the patient—I have not seen any bad effect follow. Of course, it was to be feared that by removing the nerve one might interfere with the nutritive condition, but as a matter of fact the areas which the nerves supply are remarkably limited, the area of the infra-orbital nerve are extremely small, and then, again, the nerves which are most affected fortunately do not supply the most important parts. It is the nerve supplying the cheek and the lips; fortunately the nerve supplying the eye is rarely the seat of the mischief, and hence we see the possibility of escaping trophic changes; but I have really come to ask for information and not to give it. And the information I wish for is with regard to the character of the pain, the seat of the disturbance, the mode of its onset, the cause of its excitement or origin, and the possibility of the affection of other branches of the same nerve.

If these points relating to the earlier stages of the disease are cleared up by the very wide experience of the members of this Society, I think I may say we shall make a very great step forward in the right direction.

After some observations by Mr. S. J. Hutchinson, Mr. Betts, and Mr. Ashley Barrett,

The PRESIDENT said: There is one great puzzle to me about these neuralgia cases, and one to which I have never been able to formulate any explanation at all—I hope Professor Horsley may be able to throw some light upon it—that is the great relief of pain which is often given by doing the wrong thing; by doing the thing which you are told by subsequent experience of the case cannot have gone to the root of the evil. For instance, you cut the inferior dental nerve; well, it will very likely stop all the pain for a few weeks, but often you find it comes back as badly as ever. You clearly in your first operation and in your second operation had not got to the site of the trouble; and yet, somehow or other, you have altered the nutritive conditions, and have done something which, for the time being, has arrested the pain. I have in my recollection a case in which the nerve was first divided at the mental foramen, giving the patient great comfort for a time: he could eat, shave, or talk without any unpleasant sensations; but the pain came back. The nerve was then drilled down upon in the canal; that set him perfectly right for eight months. On the recurrence of the trouble, the operation was repeated, and the drill was run down upon the nerve in the same place. But it did no good. Subsequently the patient went to Mr. Durham, who dissected back, within the mouth, to the orifice of the dental canal, and stretched the nerve severely. This did good for the time. But the point which I should like to press upon Professor Horsley is, why the doing of ineffectual operations which do not reach the seat of the disease so often seem to do good, when subsequent knowledge shows that it could not have got to the site of the evil?

There is one other point, and that is the trophic alterations that are to be seen in these cases, and which Professor Horsley lays great stress upon, as showing the lesion to be in the nerve trunk. I have myself seen three cases of great severity in which the trophic lesions, if they existed at all, were so inconspicuous as to escape observation. One of these was treated electrically with some success.

Mr. HENRI WEISS mentioned a case of peripheral neuralgia, in which a man dreaded any pressure on his face. The attacks would not come on from either heat or cold, but by pressure, and more particularly by pulling the moustache.

Mr. J. SMITH TURNER said Professor Horsley asks for further information as to the peculiarity of the special sensibility which occurs in patients who suffer from this disease, and that is that the skin is exceedingly sensitive to the soft touch, but that by hard pressure the same sensibility is not produced. It seems to me that this sensibility is a good deal the same which the eye experiences on being handled by the skilful or unskilful operator, as the case may be. The expert oculist handles the eye in a manner which seems to us almost brutal, but causes no pain; the timid operator approaches the eye gently, and produces an amount of pain which makes the patient shrink from his touch. I have noticed cases in which patients do shrink when the skin is slightly touched in the neighbourhood of the pain, but if you press hardly the pain is not felt. It seems to me that pressure obtunds pain. In the experiments which have been carried out with reference to this nerve stretching theory, there has been, I think, a good deal of what is called nerve pinching; and this nerve pinching has destroyed sensibility in some cases and effected the very same thing as nerve stretching. We have many obscure conditions of pain in the teeth which render peripheral diagnosis sometimes difficult. I have now a case in my recollection which was brought before the attention of the profession—I think it was before the Odontological Society was established—in which intense pain was suffered under movement; when the patient was at rest there was no pain, comparatively speaking. A tooth was removed, and on examination it was found that there was a detached piece of secondary dentine in the canal of the tooth, which moved about as the patient moved, and produced pain. Pain was also produced by the pressure of putting the head on the pillow. With regard to end organs, if my memory serves me, attention was drawn to the subject in a paper by Professor Marshall some three to five years ago, and a diagram was drawn of the nerves—portions of nerves which seem to spring out from the trunk on the main nerve. I believe Professor Horsley was present, and referred to them as the *nervi nervorum*. These filaments, which are nerves of sensation supplying the nerves themselves, are the subject of considerable irritation; and if we have these nerves springing from the inferior dental nerve after it enters the bony canal, we may thus be able in some measure to account for the cessation of pain when we do the wrong thing, and it returns again when the nerve assumes its wonted condition.

Mr. STOCKEN: Some time ago I brought before the Society two cases which came under my observation. Perhaps I may be permitted to mention them again, as some little light may be thrown on the discussion thereby. One was a very severe form of neuralgia. The lady was unable to speak without great distortion of the features; the tongue was swollen, the eye-lid drooped, and the saliva was constantly running out of the mouth. She had tried several remedies, some homœopathic ones, but got no relief. The peculiarity was, that as soon as she assumed a recumbent position she obtained relief. When I saw she had lost seven teeth, as a forlorn hope I recommended her taking gelsemium 15 minims and aconite 5 minims alternately. This was seven years ago, and she has been relieved from pain ever since. The other case, that of a lady who has since died, was of a similar character. She was suffering almost as acutely and had distortion of the features. I could only discover a very small abrasion on the canine tooth. I removed it, crushed it, and examined the pulp under the microscope, and found that the whole mass was an agglomeration of calcified bodies. She was relieved for a time, but the pain returned as badly as before, and when I last heard of her, she was suffering so much that she was unable to come to London.

Mr. STORER BENNETT: With regard to the question, Do we know of any cases of trophic lesions to distant parts distinctly referable to the teeth? I have a very distinct recollection of trophic lesion in a girl, the lesion being an ulcer of the cornea of many months' duration. It had been treated in the ordinary way by several surgeons without any success whatever. The case was seen by Mr. Nunn, of the Middlesex Hospital, who sent her to me. He said he was quite sure that on the eruption of the canine tooth the trouble would disappear. As a matter of fact, when the canine tooth in the course of time was erupted, the ulcer of the cornea did disappear.

You mentioned, sir, the cases when wrong treatment of injured nerves produces temporary relief. I have in my recollection the case of a patient 40 years of age, looking many years older, who was perfectly edentulous in the upper jaw; all the teeth were taken out for supposed neuralgia, but when they were all taken out it was obvious that the pain was not due to the teeth. It was then suggested that something in the bone might be the cause, and the bone was drilled into, but without any good result. Then Mr.

Henry Morris cut down upon the infra-orbital nerve and stretched it. The pain returning, he next cut into the infra-orbital canal and removed the nerve up to the fissure. On this nerve he discovered some little bodies, similar to those drawn by Professor Horsley, which seemed distinctly to be some little fibrous nodules. The operation gave relief.

PROFESSOR V. HORSLEY, replying, said, with respect to the undoubted fact of operation upon the extremity of the nerve producing relief for the time, and yet not getting at the root of the mischief: Well, it is obvious, theoretically, we may have been creating violent counter-irritation at the end of the nerve, and I should think that the category of cases belongs to Professor Gros's instances relieved by drilling. Then, again, of course it may be, as Mr. Hutchinson suggested, in these cases the mischief begins peripherally, and extending towards the centre you may have a creeping peripheral neuritis, and therefore there is no reason at all why it should not affect the branches of the fifth nerve. However, that is one point to be solved.

You said, sir, we might have trophic lesions absent in some severe cases. It was so in my own. To that I have no explanation to offer. It is of great interest to me to understand that the pain may be severe for a few minutes, then suddenly disappear, then occur again in an epileptiform manner. This complicated the diagnosis considerably. Mr. Turner also referred to peripheral disease of the teeth where the interior of the canal was affected, and of course removal cured the patient.

Then, as regards the point raised with reference to the wisdom teeth, that is a matter upon which I came to ask rather than give information. Then the cases of Mr. Stocken are extremely valuable, and it is of great interest to me to know that such cases, and after so long a period as nine years' suffering, can be treated by drugs; it gives one great hope that operation may become unnecessary. With respect to Mr. Storer Bennett's case of trophic ulcer of the cornea, I am aware of many cases published of disturbances of parts, not necessarily trophic, produced by peripheral irritation. The question I was really asking with regard to cases of trophic changes was, under what circumstances do these occur most commonly? If you have a case of severe neuralgia, so-called neuralgia, if you have very distinct disease, do you have trophic disturbances? I suspect it would be answered in the negative.

Then again, with reference to painful spots, the pain is referred to the periphery. I know there is no very great difference between slight tenderness and distinctly local pain that you get in these cases which is apparently due to the condition along the branches of the nerve.

Well now, with regard to the changes in the nerves I have removed, they all present great overgrowth of epineurium. The course of the nerve in the bone I believe to be the fountain of the mischief, and it was for that purpose I proposed that the nerve should be divided above the bone.

As to the discussion of the possible pathology, I do not know anything, and, as I said before, it is upon that point I seek information.

As regards the easy diagnosis of so-called tender teeth, I am not quite sure on that point, because a gentleman consulted me who had a first bicuspid removed in the lower jaw which made the pain worse in the next tooth. I think, unless we adopt the theory of a creeping neuritis, we cannot admit that this was a typical case of disease beginning in the periphery. I think, sir, that that concludes the remarks that I would venture to make; as I said before, I did not come here to teach, but to learn. I would just add one word, viz., that these operations in general are not so severe as they sound. Here, sir, is a photograph of my second case, the removal of the whole division of the fifth nerve, taken five days after the operation. I admit, of course, that if proper precautions were not taken these operations would be very formidable, but with the teaching of Sir Joseph Lister and others, I do not think we need fear very much.

INTERNATIONAL MEDICAL CONGRESS.

THE preliminary work in all the departments of the Congress is progressing very satisfactorily. Of the preparation for the Dental Section we can speak more definitely. Papers to be read before the section are rapidly coming into the hands of the Secretary, and are being arranged and prepared for proper presentation before the section. The various committees are giving active attention to their respective duties. A large number of the best members of the profession in this and foreign countries have engaged to give clinics in operative and surgical dentistry, and demonstrations in the

prosthetic department; and doubtless the best talent of the world, in these branches, will be present. Opportunity will be afforded to see what the microscope has done for dentistry. A microscopic department is being provided for, in which will be presented the achievements of the microscope, by means of a large exhibit of preparations as well as the various methods of mounting objects for observation.

By the energy and perseverance of the local committee in Washington, large and ample accommodation in the way of rooms, &c., has been secured for all the work of the section. For this the committee will have the lasting gratitude of all concerned, and we hope even more substantial recognition than this. A very commodious room for the general meetings of the section has been secured in a church; all these rooms are in the same locality, or sufficiently so for convenience, and they are all within a reasonable distance of the principal hotels. The Arlington Hotel will be the headquarters for the Dental Section. It will be well for all who desire good quarters during the meeting to write and secure rooms at an early day. Some reduction of rates will be made by all the hotels. The committee on transportation have secured rates from several steamship lines as follows: from Liverpool to New York and return, \$80 to \$95, for first-class accommodations.

The various railroads of this country will doubtless give reduced rates to all who attend the Congress.—*Dental Register*.

EXAMINATION QUESTIONS.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

At the Examination for Diploma in Dental Surgery on June 8, the following questions were given at the written part:—

ANATOMY AND PHYSIOLOGY.

1. Describe briefly the air-sinuses of the Cranium and Face.
2. Give the distribution of the Ophthalmic division of the Fifth pair of Nerves.

SURGERY AND PATHOLOGY.

3. Give the construction of the Temporo-Maxillary Joint. Describe the symptoms of Bilateral Dislocation. How is its reduction accomplished?

4. What are the local signs and the pathological changes of Inflammation? Give the usual results.

DENTAL ANATOMY AND PHYSIOLOGY.

1. Give examples of Teeth which have no Enamel, or only a partial investment. What do you know of the Enamel-organ in these cases?

2. Describe the microscopic structure of the Dental Tissues at the level of the neck of a Tooth.

3. Define Incisors, Canines, and Premolars. In what respects is the Canine of especial value in the human mouth?

DENTAL SURGERY AND PATHOLOGY.

1. Explain the mode of formation and character of Secondary Dentine. What symptoms may indicate its presence?

2. At what age would you treat protrusion of the Front Teeth? Give your reasons for the selection of the period, and the plans of treatment in ordinary use.

3. What are the principal defects in Almagams? What special properties are believed to be conferred upon them by the presence (i) of Copper, (ii) of Platinum, (iii) of Gold?

PASS LIST.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

THE following candidates were admitted L.D.S. in April last :—

Peter Sydney Spokes, M.R.C.S., London.

Alfred Stevens, L.D.S.I., London.

David Thomson, Edinburgh.

John Gardiner Fraser, Edinburgh.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

The following candidates were admitted L.D.S. on June 10th :—

James F. Rymer, M.R.C.S.

Robert J. Lovitt.

James Battersby.

Alfred Parker Cater.

Abraham William Frost.

Percy Allison Linnell.

Charles Frederick Newton Petit.

Thomas George Read.

Charles Cecil Robinson.

George Seymour.

Three candidates were referred.

Editorial.

EXAMINATIONS SINE CURRICULO.

By the Dentists' Act, 1878, power was given to the medical authorities to grant qualifications in Dentistry, and

“ Each of the said colleges or bodies shall admit to the examinations held by them respectively under this section (18), any person desirous of being examined who has attained the age of twenty-one years, and has complied with the regulations in force (if any) as to education of such college or body; and . . . each such council or other governing body shall . . . conduct the examinations in such manner, and shall grant certificates in such form, as such council or other governing body may from time to time, by byelaws or regulations, respectively direct.”

Accordingly, the examinations *sine curriculo* were established by the Royal College of Surgeons of Edinburgh, the Faculty of Physicians and Surgeons of Glasgow, and the Royal College of Surgeons in Ireland. By those *sine curriculo* examinations over 500 persons have obtained qualifications in Dental Surgery. Of that number four-fifths have been granted by the R.C.S.I.

It is now announced that the R.C.S.Edin. will cease to hold *sine curriculo* examinations after December, 1888. Just as the institution of such examinations has conferred some benefit upon the Dental Profession, it may also be said with equal truth that that benefit is not unalloyed. This voluntary action of the R.C.S.Edin., closing its doors to the further admission of candidates *sine curriculo*, is one which the circumstances of the case warrant. For, after ten years of grace, surely they who are eligible and may be anxious to obtain an L.D.S. diploma without any prescribed education, but after fair and searching examination, have had ample time allowed to prepare themselves for such; and now sufficient

notice is given of the time when the doors will close, at the R.C.S.Edin. at all events.

This action of the Council of the Edinburgh College will meet with the approval of those who have the real interests of the profession at heart. And it is to be hoped that the Faculty of Glasgow and the R.C.S.I. will act in harmony with those interests. Indeed Mr. R. Macnamara, the representative at the General Medical Council of the R.C.S.I., stated at a meeting of that Council on October 18th, 1878, that "after the 30th of August, 1881, the present regulations (with regard to the admission of dental candidates *sine curriculo*) would not be in force, and the candidates would be required to have passed through a curriculum."

To further extend the period of grace beyond ten years would only tend to evil, and to increase the unfairness to those students who complete the curriculum at the expense of considerable energy, time and money.

GOSSIP.

A COMPLIMENTARY dinner was given to Professor Tyndall on the 29th ult., on the occasion of his retiring from the chair of Natural Philosophy in the Royal Institution.

At the forthcoming meeting of German naturalists and physicians, to be held at Wiesbaden from September 15th to 24th, Dentistry is one of the subjects to be represented.

DR. GEORGE HARLEY, F.R.S., in a paper, read before the Anthropological Institute, on the relative recuperative powers of man living in a rude and man living in a highly civilized state, brought forward a number of hitherto unpublished, though mostly well-known facts, demonstrating that the refining influence of civilization had not been altogether the unalloyed boon we so fondly imagine it to have been. For the cases cited went far to demonstrate the fact that while man's physique, as well as his mental power, had increased during his evolution from a barbaric state into a condition of *biensance*, his recuperative capacity, on the other hand, has materially deteriorated. Every appliance adding to man's bodily

comfort, as well as every contrivance either stimulating or developing his mental faculties, while increasing his personal enjoyments, materially diminishes his animal vitality; rendering him less able to resist the effects of lethal bodily injuries, or recover from them as well and as quickly as his barbaric ancestors, or his less favoured brethren.

IN a lecture delivered by Dr. Klein, F.R.S., at the Royal Institution, on the Etiology of Scarlet Fever, he strongly urged that all milk should be boiled, or at any rate heated to at least 185° Fahr., before being consumed; it being well known that no species of micrococci hitherto discovered are capable of surviving a temperature of 212° , many of them being killed by an exposure to 180° to 190° Fahr.

MR. WALTER WHITEHOUSE will demonstrate his method of duplicating plaster models with his improved composition at the Dépôt of the Dental Manufacturing Co., on Thursday, the 21st inst., at 5 o'clock.

THE presence of "pearls" in the so-called milk of the cocoa-nut has been verified by Dr. Sydney J. Hickson. Though (he writes in *Nature*) they are very rare, 1 in 2,000, yet he was fortunate enough to find two specimens. They consist of carbonate of lime, and are considered to be allied in their phenomenal order to tabasheer.

ON the 11th ult. Prof. Flower, C.B., F.R.S., Director of the Natural History Museum, South Kensington, gave an address at a meeting of the Middlesex Natural History and Science Society, on the Teeth of Mammalia, referring particularly to the splendid specimens exhibited in the Index Museum at South Kensington.

DR. B. H. CATCHING writes:—A cordial invitation is given to all dentists who will attend the International Medical Congress, to be held at Washington, D.C., U.S.A., September 5th, to attend the meeting of the Southern Dental Association, which meets at Old Point Comfort (Fortress Monroe), Virginia, August 30th. The time of meeting is the week before the Congress, and the place only a few miles south of Washington, and but a few hours by rail from New York. A grand Southern welcome will be given all, and a

most enjoyable and profitable time is promised. After the adjournment of the meeting the visitors and members will proceed to Washington by steamer.

MR. GEORGE PEDLEY sent some specimens of engine drills which have trocar or three-sided pyramidal points. They cut remarkably well, and are easily sharpened.

THE annual meeting of the British Dental Association will be held in Glasgow, on the 18th, 19th and 20th of August, under the presidency of Mr. J. Brownlie, L.D.S.Eng.

MR. DAVID WATSON, L.D.S.Eng., has been appointed Dental Surgeon to the London Society for Teaching the Blind, Upper Avenue Road, N.W.

DR. G. CUNNINGHAM, B.A., D.M.D., L.D.S.Eng., has been appointed Lecturer on Operative Dental Surgery at the National Dental College, *vice* Dr. St. George Elliott, resigned.

MR. GORDON HOOPER, L.D.S.Eng., has been appointed Dental Surgeon to Bethlehem Royal Hospital and King Edward's Schools (Girls' Division).

MR. E. LLOYD WILLIAMS, M.R.C.S., L.R.C.P., L.S.A., L.D.S.Eng., has been appointed Assistant Dental Surgeon to the Dental Hospital of London.

DR. J. F. W. SILK, M.D.Lond., &c., and Mr. P. Sidney Spokes, M.R.C.S., L.D.S.Edin., have been appointed Anæsthetists to the National Dental Hospital; and Mr. Charles Glassington, M.R.C.S., L.D.S.Edin., late Anæsthetist to the same Institution, has been appointed Assistant Dental Surgeon.

A CORRESPONDENT writes upon the subject of registered dentists being liable to serve as jurymen. It was some years ago pointed out in these pages, that unless dentists took the trouble to see that their names were not included on the jury lists, they were liable to be summoned and to serve. New lists are usually made about this time of year, and if exemption have not been hitherto made, application should now be sent in.

THE Annual Meeting of the American Dental Society of Europe will be held at the Hotel zum Riesen, Coblenz, on Thursday, September 1st at 10 a.m., and continue for two or three days. Messrs. E. P. George, B. Cohen, and N. S. Jenkins form the Executive Committee. The work has been divided this year into sections, and reports will be presented on Operative Dentistry, Dental Materia Medica, Prosthetic Dentistry, Dental Education, Dental Pathology and Histology. Clinics illustrating various methods of operating may be expected. There will be an exhibition of instruments and of models and appliances for plate work and regulating cases. Gentlemen who design contributing papers and who have not already sent in the titles of their essays are requested to communicate them to E. P. George, 5, Marien Str., Frankfort a/M.

PROFESSOR TURNER, writing on "Variability in Human Structure" (*Journal of Anatomy and Physiology*), says various lines of evidence point to the continent of Asia as the original home of man, from which he probably spread by slow migration over the habitable globe. Whether he did or did not originate by a process of evolution from some ape-like mammal it is impossible to speak with certainty. So far as the evidence is at present before us the so-called Semian characters, sometimes described as present in the human skeleton, are not such as would lead any competent anatomist to mistake human bone for that of an ape, or to say that in the fossil remains of man, so far as we know them, the existence of a transitional form between man and the higher apes has as yet been discovered.

IN 1720, William Caslon, an engraver of gun barrels, first started letter cutting. It was an epoch in English typography when this man cut his first founts of pica, roman and italic. Few letters of to-day will compare for beauty with those of Caslon.

THE manufacture of gas from paraffin oil is attracting considerable attention just now, consequent upon the large production in some works of qualities of oil intermediate between the burning and lubricating kinds, for which there is an extremely limited demand. These intermediate oils are especially interesting, because from them can be obtained gas of a high illuminating power. In the distillation of one ton of cannel-coal, 12,208 cubic feet of gas are obtained of 35.62 candle power, the total light-giving

value being equal to 1490·91 lbs of sperm, while from one ton of paraffin oil is obtained 24,757 cubic feet of gas of 60·82 candle power, equal to 5,160 lbs. of sperm. The apparatus for the manufacture of the oil-gas is said to have been in the hands of practical men for months, and has been found to work with perfect ease. The relative cost of production is not stated.

THE generally accepted statement that the workers among honey bees, *apis mellifica*, are asexual and that the queen alone is a fertile female capable of ovipositing, will have to be modified if not discarded. There have been recent investigations which seem to have disclosed that the so-called neuters have both ovaries and partially developed ova. Whether these ova are fertilized under ordinary circumstances, or whether they are awaiting fertilization under extraordinary conditions, doth not yet appear; but patient workers are not wanting who will probably ere long clear up the mystery and fix our knowledge of the economy of the honey bee on a surer foundation.

A NOVEL clock, the outcome of French ingenuity, has lately been patented. The dial is of parchment, upon which are painted groups of flowers intertwined with the numbers indicating the hours and minutes. Instead of the hands there are two bees, which flit from flower to flower, marking the moments as they fly. These bees contain each a piece of iron, and the hands, which are behind the parchment, are magnetic at their free ends, the other parts being of brass. By these magnetic ends the bees are attracted, and one performs a complete revolution each hour, while the other completes its annular course in twelve hours.

A CASE is reported to the Anthropological Society of Paris of a father, seven sons and four grandsons, all of whom possessed a supernumerary pair of mammæ.

SPENCER MOOR shows that protoplasm is effected by light just as a solid body is when twisted and strained; and further that protoplasmic movement is accelerated by an increase in the intensity of light and not by an increase of temperature.

THE experiments of Dr. B. W. Richardson have revealed the important fact that oxygen which has once been respired by animals no longer possesses vitalizing properties, not even after it has been completely freed from carbonic acid and the other products of the respiratory process. Animals when placed in an atmosphere of such second-hand oxygen become drowsy and soon succumb to its toxic properties. The doctor has further demonstrated that the vitalizing properties of such oxygen can be completely restored by subjecting it to the action of electricity. In this we probably have an example of the importance of electricity in the cosmical economy in restoring to the atmosphere its life-sustaining condition. Were we keen enough to appreciate it we should see St. Elmo's light on every spire of grass, giving forth its wonderous energy to re-ozone the air which animals had used. Most likely, too, the thunderstorm does the same work, and so we are helped to understand and explain the refreshment we obtain, which is so patent when the storm has passed.

OZONE has been condensed into a light blue fluid at a pressure several atmospheres with a temperature of -181.4 Cent. It is transparent in very thin layers, but is quite opaque in layers 2 millimetres thick. It boils at -106° Cent.

WHEN vegetable fibre is embedded in powdered charcoal in a closed box, and gradually heated to drive off the volatile matter, and then brought up to a white heat, it is converted into a carbon having a metallic lustre like black lead. It is then elastic, and possesses considerable strength. We have an example of such a result in the manufacture of carbon filaments for incandescent lamps, which was given in the RECORD, vol. vi., p. 485. This carbon is so refractory that it can be exposed to a very high temperature without breaking up, and this property has been utilized in the production of matrices in cast iron. Using a piece of lace, or embroidery, or even a fern frond which has been so carbonized, molten iron is poured on each side of the object simultaneously. It is remarkable that when lace is used the metal does not run through the meshes if they are not larger than $\frac{1}{30}$ th of an inch in diameter. If the lace be used as a vertical diaphragm in a mould of sand, and all its edges are grasped in the parting of the moulding box, the iron casting readily separates on

cooling, and the lace can be withdrawn from it uninjured and can be used again and again. The dies so obtained can be used for embossing, as they have a wonderful sharpness of detail. Most likely this sharpness arises from the disposition which there is in the molten iron to unite with the carbon of the fibre, but which is prevented by the sudden lowering of the temperature. That the fluid metal does not pass through the meshes or run together arises from the skin of oxide which is formed from the contact of the fluid metal with the air, and this oxide probably also fills the meshes of the lace.

THE Laboratory at Plymouth, erected by the Marine Biological Association of the United Kingdom, is to be opened shortly.

M. BERTILLON, writing upon the morphology of the nose in the *Revue d'Anthropologie*, enumerated twenty-one shapes of that organ.

PROFESSOR W. H. FLOWER, F.R.S., British Museum, and Professor G. T. Brown, Agricultural Department of the Privy Council (whose paper on "Dentition as Indicative of the Age of Animals" appeared in vols. 3 and 4 of the DENTAL RECORD), have been made Companions of the Bath.

THE formation of the long-sought-for hydride of nitrogen— $(N H_2)_2$ —is announced by Dr. Theodore Curtius. It is a stable gas, of different odour from that of ammonia, soluble in water, and of basic properties.

AT the meeting of the Royal Society of Edinburgh, on the 11th ult., Professor Grainger Stewart read a paper on the discharge of albumen from the kidneys of healthy people. He had found that, out of 407 individuals, albumen was present in 129, or 31 per cent. His researches led him to the following conclusions:—That albuminuria is much more common among presumably healthy people than was formerly supposed, tests having demonstrated its presence in nearly one-third of the population; that the frequency of albuminuria increases as life advances; that it is more common among those whose occupations involve arduous bodily

exertion than among those who lead easy lives; that albumen frequently follows the taking of food, especially of breakfast, which more than any other meal increases the amount of albuminuria; that moderate muscular effort rather diminishes than increases albuminuria; that it is often induced by violent and prolonged exertion; that cold bathing produces or increases it in some individuals; and that the existence of albuminuria is not of itself a sufficient ground for the rejection of a proposal for life insurance.

DR. KNAPP, New Orleans, gave a demonstration on the 25th ult., at Nelson's Hotel, Great Portland Street, W., on crown and bridge work. He showed the several steps in his method of making a solid gold crown with a porcelain face, and also of joining these together to form "bridge-work." Great attention was given to detail, and the finished pieces were most beautiful in their workmanship. The investment used was calcined marble dust and plaster, the great advantage of which is that it does not fly or crack in soldering. Another feature of the demonstration was the use of a modified oxy-hydrogen blow-pipe adapted to an ordinary nitrous oxide liquid gas bottle, and by an india-rubber tube to the common illuminating gas bracket. The mixed gases are conducted through a rubber tube $\frac{1}{8}$ -inch bore to a small metal tube, at the point of which combustion takes place. The pressure within the $N_2 O$ bottle gives a blast to the small-pointed pencils of flame of $\frac{1}{2}$ -inch in length. The great heat readily fuses the twenty-carat solder which is used, and the facility with which the instrument is manipulated enables the operator to melt the solder within the small and deep mould, which has only a narrow opening through which the flame can be inserted. The full details of Dr. Knapp's method was given in a paper read before the First District Dental Society of the State of New York, in January last, and was published, with illustrations, in the February number of the *Dental Cosmos*.

ERRATUM.

MR. ROWNY writes to correct an error in the formula which he gave of a chromic acid solution for battery, published in vol. VI., page 339 (August, 1886). "Sulphuric Acid, 16 grs.," should read *16 ounces*.

THE DENTAL RECORD.

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No. 8.

REVIEW OF BOOKS.

MECHANICAL DENTISTRY. By Charles Hunter. Third Edition.
London : Crosby, Lockwood & Co.

ON looking over the third edition of this work, we cannot help thinking that had the author devoted more time and care to describing and illustrating the general and practical parts of Dental Mechanics, such as gold and vulcanite work, and less in gleaning the opinions of others, this book would have been a more valuable addition to the literature at the command of the dental student at the present time.

It is, in our opinion, weak where it ought to be strong.

For instance, a very brief and imperfect description of the use of Stent and the Godiva compositions is given, and another composition which, in our opinion, is even preferable to these, is not mentioned at all, whilst great stress is laid upon such old-fashioned materials as wax and gutta percha.

In the chapter on sand moulding, the author goes out of his way in describing a core casting much beyond the skill of the average student, whilst there are other and simpler methods for arriving at a more satisfactory and perfect result. Supposing, however, that this particular model is cast in zinc, it is difficult to understand how the plate could be got off the model or adjusted to the mouth.

The pages devoted to clasps and bands we look upon as the best in the book, and convey sound practical and reliable information to the student ; so also does the chapter on bites and bite mounting. At the same time we think that fuller information might have been given on the first part of the last-named subject.

The chapter devoted to vulcanite work is perhaps the weakest in the whole book, and certainly needs the most thorough revision.

In chapter five, on swaging plates, we notice with some astonishment that the use of pliers is advocated to correct the misfit of a plate owing to the shrinkage of the zinc cast. Such is not good practice, nor should it be recommended. Our experience teaches us that when the plate accurately fits the zinc model, it is better to try it in the mouth, when in all probability the gum will yield sufficiently to allow of the plate going into its place. Should

it not do so, then our best course is to obtain a new zinc cast, padded a little on the ridges where the plate rests.

In conclusion, we must candidly admit that the author has not done justice to himself in the original portions of this work, for it is evident that he has allowed himself to be carried into details of what others do, or are supposed to do, instead of furnishing the student with exact particulars of his own practice. This is to be regretted, as the want of a good practical work on dental mechanics is generally felt and recognised by every dental student and young practitioner.

GUIDE TO THE ADMINISTRATION OF ANÆSTHETICS. By Henry Davis, M.R.C.S. London: H. K. Lewis.

THE author's object in writing this little book of 52 pages is to supply in a compact form the chief details which are requisite for the safe administration of the various anæsthetic agents now in use. That object is fairly well accomplished; but, perhaps, brevity is too closely considered. Some few words, at all events, might have been inserted about shock as a cause of syncope in chloroform narcosis, pointing out the danger of a small dose of chloroform. It was at one time a not uncommon practice in minor operations, as tooth extraction, to give a "few whiffs" of chloroform. Such a practice is dangerous in the extreme, and cannot be too strongly denounced.

With regard to cocaine, nothing is said of its use hypodermically, as in the extraction of teeth; but attention is directed to the alarming symptoms and danger which occasionally follow its use. Of the treatment of the toxic effects of cocaine, nitrite of amyl and nitro-glycerine might have been mentioned as beneficial.

No mention is made of the physiological effects of chloroform, though the action of ether, nitrous oxide and cocaine is in each case referred to.

The subject would admit of amplification and the work still maintain its character of a concise "guide," at the same time adding to its usefulness.

THURLEY TIGHE: OR, THE LIFE OF A STUDENT, by Felix Weiss.
London: The Dental Manufacturing Company.

THE contents of this book originally appeared as a monthly supplement to the DENTAL RECORD, and therefore it will be not altogether new to our readers; but when a dentist who has been nearly fifty years in the practice of his profession takes upon himself

to give us his experience, the least thing that we can do is to listen to what he has got to say.

We do not for one moment infer that the author of "Thurley Tighe" has given in his book an account of his own life, for it appears to us that he has taken an imaginary character, surrounding him with those incidents and placing him in situations calculated to illustrate the career he desired to depict. Certainly there is enough in the book to enforce those broad principles of professional integrity that usually culminate in marked success.

In our opinion, the author has made a mistake in depicting his hero as the recipient of fortune other than that resulting from his own industry; but it is in those chapters devoted to a criticism of our institutions, our hospitals and our societies, our professional progress, and the means at our disposal for the education of our students, that his advanced views are best illustrated and, we might say, made most useful. That some of these views are in accordance with the present ideas of procedure may be inferred from the fact that many of them have since been carried out. As he says, "Many problems have yet to be solved, but we look to education in its broad sense to make us better fitted to do our duty in whatever station it has pleased God to call us, and whether we be male or female, our fitness to fulfil those duties must depend in a great measure upon ourselves."

We can safely recommend this book to all who are actively engaged in the practice of their profession, and more particularly to the students. In it they will find advice which a long experience and careful observation has enabled the author to give; and if they do not agree with all the opinions expressed, at least they will find a *raison d'être* for much that he has advanced.

A CASE OF INFLAMMATION OF THE BRAIN FROM DENTAL ABSCESS.

By J. TRUDE FRIPP, L.D.S.Edin. & I.

IN the end of March last, the Rev. ——— (whom I had known for about a year and a half) called to consult me with reference to a general tenderness and inflamed condition of the right side of the lower jaw. He had also an eruption extending over most of the right side of the face and chin, which he had been treating with some patent ointment. There was also very considerable

swelling of the sublingual and submaxillary glands. The patient was considerably out of health, having for some time been very much overworked, and, being of a restless and excitable temperament, had not taken sufficient rest. The second lower molar had been filled some years previously by a gentleman in the city, but trouble supervening, the operation of rhizodontophy was performed, and, as far as I could learn, the tooth had remained comfortable ever since.

At the time when I saw it, there was nothing to indicate that this molar was implicated in the trouble, and I therefore, as a temporary measure, painted the gums with Tr. iodi et aconiti, and referred him to his medical man for general treatment, thinking that the local trouble was perhaps due to the general condition. Two or three days after—on a Thursday—the patient called again without appointment, but as I was engaged he did not wait to see me.

I heard nothing further until the Saturday, when I learned that he was seriously ill and had been delirious most of the day. There was then an abscess pointing on the chin, and the doctor who was attending him diagnosed a deep-seated abscess in the region of the ear, which caused inflammation of the brain.

On Sunday another physician was called in consultation with the local medical man, and as the patient was a personal friend I went to the house to hear his report. He considered the case a very critical one, and approved of the treatment which was being pursued. In answer to a question as to the probable cause, he said he could not give a definite answer, but it might be one of a number of things, among others "a bad tooth." I then related what I knew of the molar in question, and he replied that it was no doubt the "*fons et origo mali*." With his permission I removed the tooth, and the patient gradually recovered, the deep-seated abscess dispersing without further treatment, and the abscess on the chin and eruption on the face healing quickly. The tooth on removal showed signs of extensive and irregular absorption of the root, due to the contact of pus, which, owing to the vent provided through the tooth, did not point on the gum as usually happens.

The case is interesting and instructive, as showing how much obscure and secondary trouble may arise from a diseased tooth without much indication in or around the tooth itself.

RIGGS' DISEASE.

(PERICEMENTITIS, PYORRHOEA ALVEOLARIS, DISEASED GUMS,
LOOSE TEETH, ETC.)

By GEORGE A. MILLS, M.D., New York.

AT a meeting of the Connecticut Valley Dental Association, about eighteen years ago, at Northampton, Mass., John M. Riggs, M.D., of Hartford, Conn., was invited to make a proclamation (associated with a clinic) of his views concerning a diseased condition of the gums and the sockets of the teeth which often causes the loosening and falling out of the same. Up to this time nothing had appeared in the literature of dentistry except that which classed this disorder among the incurables, and it was spoken of as the result of senility; hence the common remark among people, "My father's and mother's teeth all dropped out, and it is only a matter of time with me." The removal of tartar as an external deposit upon the teeth was classed simply as an operation of scaling. This operation only recognised the foreign matter that could be seen. Dr. Riggs, in announcing his original views—while he gave it as his opinion that the deposits of the tartar were the cause of the disorder under consideration—stated that his observation and experience matured the knowledge that there was a decided progressive inflammation existing under the gums and wasting both the hard and soft tissues, so that their attachments with the roots were gradually being destroyed. His knowledge of surgical principles suggested a practical application to these diseased localities, and he proceeded to the removal of all foreign substances from the roots of teeth, and the trimming of the necrosed edge of the alveolus to the life-line, leaving nature to restore to a normal condition. Dr. Riggs' views naturally excited a variety of comment—some expressing disbelief, and others accepting his novel ideas and statements. Not a few denied the existence of a necrosed edge of the alveolus. Dr. Riggs had devised a set of instruments well adapted for the treatment of this disorder—and these were unique and new, yet there was an effort on the part of a very few to dispute his claim to this invention; this did not prove a success. This body (the Connecticut Valley Dental Association) subsequently passed a resolution giving credit to Dr. Riggs for originality relative to the new pathology of the disorder now termed Riggs' disease, and so named at about that

time in honour of Dr. Riggs. I have previously remarked that nothing of the doctor's views had ever been published, so far as known. But—having become personally much interested in this disease, and in the discussion of it, and also finding my position regarding it misunderstood by several dentists—I was led to prepare a series of articles (six) which were published in the *Dental Cosmos* during the years 1876 and 1877, under the title of "What I know about Riggs' disease," in one of which articles I challenged the record of views corresponding to Dr. Riggs'. Since then not a word has come from any source to show that he is antedated in the matter. I may add that a confirmation of his views and their acceptance by many members of the dental profession have gradually taken place. I am glad to say that to-day it is the most prominent subject for consideration before dentists generally. Only a limited number, however, have come to a correct understanding of what is required and how to meet the requirements. These few are demonstrating a successful treatment of the disorder. At this point of my article it seems advisable to introduce a feature which I shall elaborate later on; it is in reference to the technical term by which this disorder is now known—viz., *pericementitis*, substituted for the term well known by medical men—dental periostitis—meaning inflammation of the dental periosteum. This term (*pericementitis*) originated in the laboratory of Charles Heitzmann, M.D., of New York City, during the late investigations made there by dentists under his instruction. The general subject of *pericementitis* it is not my design to discuss here, but it is necessary to make the distinction clear between Riggs' disease and general *pericementitis*. Riggs' disease is a peculiar phase of *pericementitis*; it may exist to the final loss of all the teeth, without a sign of any other phase of this disorder.

As the nature of this disease is so plainly embodied in my brief history of the matter, which includes its pathology, it would seem that my readers need not be ignorant of its main features; therefore I pass to consider the diagnosis.

To diagnose an incipient case, or first manifestation, as it is often seen in the mouths of children (even at a very early age): The simplest form of the disease may often be seen at the peripheral part of the festoon of the gum-tissue indicated by a congested appearance; by lifting this gum with a delicate instrument, there will be seen a little seed-like

granule of calcific substance. Another case might show a deep red and raw-looking, elongated appearance of the gum-tissue about the necks of the teeth, and with or without any deposit; there may be also a looseness of the gum about the teeth, which causes quite a pocket. This latter condition is often a sequela of exanthematous disorders. The gums are often extremely sensitive to the touch. In the various cases we find general congestion, easy hæmorrhage, pale and bloodless gums, a decidedly anemic and frequently pimpled surface of the gums—the latter appearance in adults. Not uncommonly a first warning to the patient (adult) will be pain or tenderness about the tooth or teeth, and an examination will not reveal any decay, death of pulp (commonly called nerve), or evidence of inflammation of pulp. This is what I shall term a subtle manifestation, for it has been believed there could be no inflammation of the dental membrane without a disturbance of the pulp. This is now proved to be untrue, for abscesses do occur while the pulp remains normal. In a large proportion of cases there will be, on light pressure, a flow of pus under the gums, and oftentimes it is a copious discharge. This may be general, or it may be confined to a single tooth. Looseness of one or more of the teeth may be observed; also malposition, and this commonly after an occluding tooth is lost. I have given in detail enough of the manifestations to lead one even superficially familiar with unhealthy conditions to the diagnosis. It will be observed that I have omitted other conditions of disease that are manifested in the mouth, associated with the teeth and allied structures—viz., syphilis, salivation and scurvy. While in some instances these may be separated from the disorder in question, yet they are sometimes complications. I will mention another marked diagnostic feature associated always with an active stage of the disorder, and that is the odour which is distinctly noticeable to one familiar with Riggs' disease. There are other local manifestations that are, without doubt, largely influenced by the disease, but are commonly classed as expressions of constitutional debility, and still they may be wholly the result of the disorder under definition. This is proved by the arresting of the disease when the disabilities referred to are removed. Recession of gum-tissue is often seen, and no apparent inflammatory condition. While this is a peculiar phase, I maintain it is the same disorder. My term for it is atrophy of the gum-tissue—erosion of the tooth-

structure, causing grooves across and around the necks of the teeth, not infrequently taking a serpentine direction. This also is a manifestation of the same disorder, as it is arrested by the treatment which will now be described.

TREATMENT.—As the nature of the disorder has proved to be novel, so will the treatment appear, as Dr. Riggs was the inventor of a set of instruments with which to perform the operations required in treating the disease. Each one is six inches in length, including the handle, which is of ebony and steel, octagonal and tapered; the blades are seven-eighths of an inch long, bent at an obtuse angle. The instruments are in two pairs, and there are two single ones. One pair has a knife edge and a safe edge; the other pair has the same, but these are reversed in their bevels—made so for the purpose of working at a different angle of the mouth, and from the operator instead of toward him. The single ones are double knife-edged, and differing in thickness of blade. Perhaps no better idea can be given of the general form of the blades than to say they resemble the half of a snipe's bill, the long ovoid point being particularly adapted to ferreting out the intricate and deep-seated disordered parts of the hard and soft tissues about the roots of the teeth. In their dimensions they may seem ponderous to a novice, but in the hands of an expert, no instrument can be more efficiently and delicately used. It must now be seen, by the description and location of Riggs' disease, that most of the operation is under the gum-tissue and out of sight, so that necessarily to know when the operation is complete at a given point can only be accomplished by an acquired and acute sense of touch. It may be said that the Riggs treatment has instituted a distinct and systematic mode of arresting the disease. Rightly understood and rightly practised, I regard this treatment as the most efficient in dental surgery. The severity of the cases differs according to constitutional conditions, and, if the dentist is the doctor, he will know whether the patient can be wisely aided by constitutional treatment. The prognosis must be based upon the conditions as they appear in each case.

From an extensive experience within the last ten years in the treatment of a large number of cases, and the success attained, I am justified in saying that Riggs' disease can no longer be classed among the unremedial ones.

It is perfectly plain that this disease is not confined to any one

period in life. Under the age of forty I have had numerous cases in the most active stages of progress—so noticeable that there was almost spontaneous hæmorrhage of the gums, and such an excessive flow of pus that the service of napkins for absorbing was required in sleeping hours. These facts can be testified to by well-known physicians. As one impressed with the prevalence of Riggs' disease, and its destructive effect on the general health, I should be remiss in duty if I were silent, or neglected to call the earnest attention of medical men and the public to the grave facts, for they have had too little consideration. I would say emphatically that the most serious complications may arise, and the worst septic conditions may be threatened and encountered from pure neglect. That one disorder not arrested, calls others of a more serious nature into existence is a well-known fact among medical men.

Seeing in the May number of the RECORD a report of papers and discussions before the Odontological Society of London, all of which I perused with much interest, and noticing particularly the remarks of Mr. Pedley to the effect that Dr. Riggs had never published his views of the pathology of the disorders in question, allow me to say that an article can be found in the file of the *Pennsylvania Dental Journal* (now extinct) in 1875. This article was also republished in 1877 in, I think, the September or October number of the *New York Dental Miscellany*. A perusal of this will show what Dr. Riggs says for his views. Also Dr. Cunningham says, in reply to Dr. George Field, that Dr. Mills was responsible for the term "Riggs' disease." In no sense is this true, except it may be construed that it was because I have always made use of the term in my articles, and I have done so faithfully for the honour of the doctor. The term originated in the mind of Dr. B. F. Bishop, a well-known and much esteemed American dentist, and in this wise. In making up a programme for a meeting of the Connecticut Valley Dental Society, which passed the resolutions I have referred to conferring honour on the doctor, he hit upon the term Riggs' disease, and it was put into the programme. This I had from Dr. Bishop since his late visit to Europe. I now repeat what I have often said here among my *confreres*, that nothing can or will dissociate his name from the late history of this disorder under discussion.

As I have referred to the term given it at Dr. Heitzmann's

laboratory by him and Dr. Bödecker, and being a student of Dr. Heitzmann, I accepted it; and I do not see yet any cause for a change. Certainly I do not accept the term "pyorrhœa alveolaris," for, in my view, it embraces so small a part of the full meaning, and I wonder that it is so much used by many intelligent gentlemen. Only last March, Dr. Rehwinkle, who announced the term in this country, said to me that it was not at all a satisfactory term. Yet well-digested knowledge will put that to test in due time. In the meantime the question what we will do about it is in order, and will continue to be a profitable subject certainly, until more knowledge is evinced of the treatment than is made apparent by most of those who talk in societies and write in journals. Very few are qualified to speak intelligently of the real efficacy of the treatment announced and practised by Dr. Riggs—certainly with those who have qualified themselves in his method—I am positive that no method yet known can prove more successful, *i.e.*, the part that it demonstrates in mechanical surgery. I also do know that auxiliaries of helpfulness have come to take part in a larger degree than was associated with Dr. Riggs' practice. I feel that I can speak with certainly as much intelligence, if not more, than most men, for no one has been more intimately associated with the late Dr. Riggs in the interest of this subject than myself; and I feel that my many friends will substantiate this seemingly emphatic declaration. I have zealously championed the views and interest of Dr. Riggs for the last eleven years, with the exception of admitting that the lime deposits are the cause. As it is only common sense to admit that cause is always *in esse*, we will be compelled for the largest success to go back to constitutional aids. After eleven years of special practice in this field I have met a very large number of cases, from the least to the greatest, and I am prepared to say that it will take the skill of more than the mere mechanic to deal with them. Unless "the dentist is a doctor" he will only prove a weak and inefficient contender with this destructive disorder.

It is believed that Dr. Black has added and, it is to be hoped, that he will yet add more valuable knowledge on the characteristics of the tissues involved in this disorder; and it will prove of much profit to all ardent lovers of real knowledge to faithfully read all that is being published of his works in the *Chicago Dental Review* as it appears from month to month.

IMPLANTATION OF TEETH.

So far as we (*Independent Practitioner*) can learn, the operations made by Dr. W. J. Younger, of San Francisco, at the East during his visit here last autumn, have not proved invariably successful. The case in Buffalo was not perhaps a fair instance by which to judge of the practice as a whole. The patient was young and healthy, but the implanted tooth had been extracted for some years, and had rested in an unclean place during all the interim. For a time it remained firm and appeared to be doing well. Then it was noticeably less stable, and this mobility increased until it finally fell out, despite the apparatus by which it was attempted to hold it in position. There was never any soreness or inflammation in or about the artificial socket—indeed, we should have felt more hopeful for the final result had a moderate degree of inflammation succeeded the implantation, for it would have been an indication of some functional activity in the tissues.

Upon its removal the tooth gave no evidence of being possessed of a pericemental membrane, nor of any degree of vitality in the cementum. There had, however, been a resorption of the surface of one side of the lower third of the root, which had left it in a honeycombed condition. We were very much disappointed in not having the opportunity to make a microscopical examination of the tooth tissues, but the patient carried it away and lost it.

The tooth implanted for "Archie," an employee of the S. S. White Dental Manufacturing Company, at their depôt in Boston, during the meeting of the New England Dental Society in that city last October, also dropped out some time after its implantation. We know nothing of the history of the case, aside from the fact of its failure. It does not necessarily follow that all implantations are failures, but these instances certainly teach that physiological law cannot be violated with entire impunity, and that there are factors which have been overlooked or ignored. Even if every operation made by Dr. Younger at the East should result in failure, the profession will still be under obligations to him for calling attention to the fact that nature will sometimes submit and adapt herself to strange circumstances.

FRACTURE OF THE HARD PALATE IN A CHILD.

DR. E. HARRISON GRIFFIN, New York, reports the following interesting case to the *New York Medical Record*. Otto N—, male, aged two years and eight months, was referred to me by Dr. Holgate, on account of an injury to the throat. The history of the case is as follows: While playing with a piccolo, the child fell, and the sharp end being in his mouth, the instrument cut through the palate. The mother took him to a physician, who recommended a gargle. This was used persistently for three days, but the child's throat did not improve. Whenever the patient attempted to eat or drink, some of the food found its way through the hole in the throat, and thence into the nose. I saw the case on the fourth day, and found upon examination that the lower portion of the hard palate was cut completely through, the injury extending downward and involving the soft palate. The injured portion of the hard palate, attached only by a slender piece of tissue to the soft palate, hung down, and rested upon the base of the tongue. The flap was congested and swollen. Upon a casual examination at the clinic, it seemed quite simple to pass a curved needle through the edges of the flap, and bring it into position; but when I saw the case at my office, I saw that the edge of the wound was so well up on the hard palate that an operation of this nature was impossible, unless holes were drilled through the fractured bone to accommodate the passage of the needle. If such an operation had been feasible, it would have been so in this case, as the child bore its suffering and allowed me to manipulate my instruments in its throat without any outburst of fear or terror. I had no occasion to use any anæsthetic. If the attempt had been made to drill or use much force in trying to sew the parts in position, the flap would have been torn from off its slender hold. On December 19th, I sent the case to Dr. Perry, dentist, with instruction to make an obturator for the child's mouth, after the following manner: The plate was to be perforated for drainage and one side was to go well down and against the soft palate, so that the flap could be held well into position. The plate was held in the mouth by cords attached to either molar tooth. On the following day the plate was in position and held the flap nicely in place. The child complained of a slight fever, possibly due to the

wound being freshened; this was controlled by small doses of quinine and brandy. The patient was able to eat without any trouble. The case was seen every other day, and the throat was cleaned by spraying with Dobell's solution, without removing the plate. Two weeks after the plate was adjusted, I removed it and found the parts so completely healed that no mark of the injury could be seen. I think that this was the only rational way of treating the case. It could not have been brought into position by stitches, as the bony parts were involved, and violence would have torn off the flap. Had the gargle been persisted in, gangrene would have taken place and a permanent opening left through part of the hard and soft palate, and the voice would thus have been permanently impaired.

BRITISH DENTAL ASSOCIATION.

SOUTHERN COUNTIES' BRANCH.

THE first annual meeting of this branch of the Association was held at Croydon on the 16th ult., Mr. Alderman S. LEE RYMER, J.P., President, in the chair.

Mr. F. W. Wheeler, Southsea, was appointed President-elect.

The PRESIDENT, in opening the meeting, made a few observations, referring specially to the great advantages of sanitary science, and the help that can be given by members of the profession to further the progress of such knowledge among individuals, societies and communities.

The papers read were by Mr. W. George Daish, L.D.S.Eng., on "Suggested Treatment of Sensitive Dentine by Nitrate of Silver"; Dr. Charles M. Cunningham, L.D.S.Edin., D.D.S.Michigan, on "The History of a Mouth treated on the Mechanical Method"; Mr. S. J. Hutchinson, M.R.C.S., L.D.S.Eng., on "The Treatment of Buried Wisdom Teeth"; and by Mr. C. J. Boyd-Wallis, L.D.S.Eng., on "A Medical Electro-Dynamic Machine."

A machine of this kind was exhibited, and the ideas embodied therein bring it very nearly to what is required for the production of the continuous, interrupted and electro-cautery currents, all of which can be brought into play in a couple of minutes. The machine consists of double electro magnets and two rotating armatures, one for general medical and experimental purposes and the other for the electric cautery and small surgical lamps, &c.

These are placed on a base board, upon which are also arranged the hand-driving wheel, the resistance coils, a varying resistance line wire, two incandescent lamps and terminals.

The field magnets are shunt wound with 3 pounds 6 ounces of No. 22 B. W. G. silk covered wire, having with the limbs in series a resistance of 16 ohms, and in parallel 4 ohms. The armatures are a modification of the drum armatures of Siemens, and are composed of iron axes, upon which a series of iron discs are strung; upon these discs are wound coils of wire; upon one armature is placed half-a-pound of No. 18 silk covered wire, having a resistance of .3 ohms, and upon the other armature is half-a-pound of No. 14 silk covered wire, having a resistance of .04 ohms. The great advantage in the arrangement of the armatures on this plan is that, by using a series of discs in the place of the ordinary solid core of Siemens, over-heating and consequent loss of current is prevented, the magnetic current is intensified, while avoiding the currents which would be generated wastefully in the mass of metal were the iron cores solid. The wasteful resistance of the armatures is greatly reduced, and the general efficiency of the machine is increased.

For nearly all medical purposes the coils may be used in series, as thus the higher E.M.F. is obtained, that is from 25 to 30 volts with this machine, equal to about the same number of Leclanchè cells. In the absence of a set of resistance coils, incandescent lamps of known voltage may be introduced as a method of reducing the current. A fine carbon incandescent lamp requires about 10 volts per inch of carbon, varying according to quality and make of carbon. Such lamps usually have the number of volts it requires marked on the glass. When driven by hand the machine yields from two to five ampères of current with the fine wire armature, and when driven by gas engine from five to eight or even ten ampères may be obtained, and when one considers that in dealing with the human body only mille-ampères are required, the power of the machine may be considered in every way sufficient.

When employed for the electric cautery or for small lamps, the coarser wound armature should be used. This armature yields a maximum current of fifteen ampères driven with the hand-wheel and twenty ampères with the gas engine. With the cautery the coils must be in parallel. These results are for the most part

based upon experiments made with the hand-wheel, but increased efficiency may be obtained by driving the armature with a lathe treadle, gas engine, or water motor.

A dinner was held in the evening, and after the usual loyal toasts had been duly honoured, the Chairman gave "The Odontological Society." In the course of his speech, Mr. RYMER remarked that it was a society which occupied a high position in this country among the scientific societies; in fact it was second to none as compared with similar societies throughout the world. The stores of knowledge which were to be found within the *Transactions* of the Society were most valuable for study for those who wish to do so. It was an exclusive society, being entirely scientific. It was no doubt carrying on a good work and advancing the interests of the profession in the highest possible way. He would conclude by coupling the toast with the name of Mr. Boyd Wallis, who responded.

Dr. STRONG proposed "The British Dental Association" and "The Southern Counties' Branch." The Association was, as it were, only an infant, and yet it had made gigantic strides since it had been established. That was the first annual meeting of the Southern Counties' Branch, and many of them were aware that the inaugural meeting was held at Brighton last year. In looking round the profession to find a gentleman who should occupy the position of chairman, they came to the conclusion that there was no one more worthy than their President. How well he fulfilled his duties at Brighton those of them who had the honour and privilege of being present knew; and most of them who read his address know how well it was delivered, and full of practical eloquence it was, not only to those associated with the dental profession, but also to them as medical men. Their President was the pioneer of reform in everything pertaining to the dental branch of the profession. Dr. Strong then paid a high compliment to Mr. Rymer's services in Croydon, remarking that his activity, his energy, and his perseverance had been rewarded by his being appointed an alderman and a justice of the peace.

The CHAIRMAN, who was received with enthusiasm, said he could not but feel deeply touched by that exhibition of personal friendship and esteem. He returned thanks for the great honour

that had been done him personally, and he thanked them with all his heart. With regard to the British Dental Association and its Southern Counties' Branch, he was sure that it was a very valuable Association, and it was very liberal in its constitution, for it excluded no man who was at all worthy of the name of a professional man. Of course disreputable advertising men could not be recognised in any association of respectable men. Every man who conducted his business in a respectable manner was eligible, and he was glad to say that a very large number had availed themselves of the opportunity of joining the Association, and that they were continually adding to their numbers.

Mr. FELIX WEISS, in proposing "The Medical Profession," said he begged, in conjunction with that toast, to propose the health of Dr. Adams, the senior member of the staff of the Croydon General Hospital. They were in their profession at that present moment thoroughly proud that they were on such excellent terms with the members of the medical profession. There were some who thought it would have been better had they not united themselves to the College of Surgeons. Going some time back he must fully acknowledge that when the opinion of the medical profession was canvassed they said, in language which could not be mistaken, "We prefer that you should paddle your own canoe." Still they went on, and he must say that they had found throughout the whole of their association with the College of Surgeons that they had been received in a manner that could not fail to make a very deep impression upon them, and he thought that to revive that old question as to whether they would be better under this or that dispensation was a mistake. He had had an opportunity of speaking to men of all shades of opinion, and when he asked, "Now, do you think the profession of dentistry would have been enhanced if we had taken any other course?" the answer from all classes of men was, "We believe you would not have been in the same firm position, respected by the public generally, and the medical profession particularly, if you had adopted any other course."

Dr. ADAMS said that the medical profession were very pleased to assist, and he believed they had assisted the dental profession on various occasions, and of course they were very pleased that they were under the wing of the College of Surgeons. Dentists nowadays must know that they were better for having to pass

the very severe ordeal of an examination at the College of Surgeons.

Mr. Wheeler proposed "The Benevolent Fund," responded to by Mr. Dennant; and Mr. J. H. Watford proposed "The Visitors," responded to by the Town Clerk.

PROGRAMME OF ANNUAL MEETING.

The Annual General Meeting of the Association will be held in the Hall of the Faculty of Physicians and Surgeons, 242, St. Vincent Square, Glasgow, and in the Dental Hospital of Glasgow, George Square, Glasgow, on Thursday, Friday and Saturday, the 18th, 19th and 20th inst.

The order of proceedings will be as follows:—

THURSDAY, AUGUST 18th.

9 a.m. Meeting of the Representative Board in the Library of the Physicians and Surgeons of Glasgow.

10.30. The Annual Meeting for business (open to members only) will assemble in the Hall of the Faculty of Physicians and Surgeons. At the termination of the Association business the meeting will be open to visitors.

Sir Edwin Saunders will deliver his valedictory address.

Mr. J. R. Brownlie will take the chair and deliver an address.

PAPERS PROMISED.

"On the Water Pressure to be obtained in all towns in Great Britain and Ireland of above 10,000 inhabitants, with remarks in reference to the use of the Hastie Motor in Workrooms and Surgeries," by Walter Campbell, L.D.S.Eng.

"On a more efficient method of conferring Dental Appointments," by W. Gordon Jones, L.D.S.I.

"On the Dental Aspect of Public Health," with a view to a discussion on the progress of the question raised by W. M. Fisher, L.D.S.Eng., and George Cunningham, B.A., L.D.S.Eng., D.M.D. Harvard, by Mr. Chas. Cunningham.

"On the mechanical training of the Dental Student," by George Cunningham, B.A., L.D.S.Eng., D.M.D. Harvard.

"On the value of Antiseptics in Dental Surgery," by E. Lloyd Williams, Esq., M.R.C.S., L.R.C.P.Lond., L.S.A., L.D.S.Eng.

"On the application of Electricity to Dental Uses," by A. Kirby, L.D.S.Eng.

1 p.m. Adjournment for Luncheon.

2.30. Reading and discussion of Papers.

5.30. Adjournment.

8.30 The President and Mrs. Brownlie will receive the Members of the Association and their friends at the St. Andrew's Hall, Berkeley Street, Glasgow. Music.

FRIDAY, AUGUST 19th.

10 a.m. The Annual Meeting of the Dental Benevolent Fund in the Hall of the Faculty of Physicians and Surgeons, Glasgow.

11. The reading and discussion of papers will be continued.

1 p.m. Adjournment for luncheon.

2.30. Demonstration and Exhibition of Instruments in the Dental Hospital of Glasgow.

6.30. The Annual Dinner of the Association will take place at the Grand Hotel, Charing Cross, Glasgow.

DEMONSTRATIONS PROMISED.

Mr. James Cumming, L.D.S.Glasgow, will demonstrate his new method of "Continuous Gum Work with any Form and Make of Tooth."

Mr. A. Kirby, L.D.S.Eng., will demonstrate his "Electric Mallet and Engine."

Mr. A. Howarth, L.D.S.Eng., will demonstrate his "New Articulator."

Mr. W. Gordon Jones, L.D.S.I., will demonstrate the Treatment of Abscessed Teeth, and their ultimate healthy retention in the jaw. To be demonstrated in the different stages on a number of patients.

SATURDAY, AUGUST 20th.

A special train will leave Queen Street for Dumbarton at about 9.30, conveying those who wish to visit the shipbuilding yard of the Messrs. Denny, one of the most complete on the Clyde. After viewing the works, the members of the Association and their friends will become the guests of the West of Scotland Branch on board the saloon steamer "*Shandon*." The steamer will visit some of the best of the Loch scenery on the Clyde, and luncheon will be provided on board. The return journey will be timed so as to enable members to catch the evening trains, south and north.

LONDON SCHOOL OF DENTAL SURGERY.

THE annual distribution of prizes of this school took place on the 21st ult. at the rooms of the Medical Society, Chandos Street. There was a large attendance of ladies and gentlemen, and Professor JOHN MARSHALL, F.R.S., President of the General Medical Council, presided.

The DEAN, Mr. Morton Smale, in his report stated that the school was as prosperous as the most sanguine could wish, and as a proof of it, called attention to the fact that the executive had purchased the adjoining house in Leicester Square to increase the accommodation of both hospital and school. The cost of purchase and alterations would be about £5,000, and to meet this expenditure the Medical Committee had promised £1,000, and Messrs. Ash & Son had given £500, and they looked to the public and the profession to supply the remainder.

In conclusion, he said that it would be a fitting action for the fiftieth year of Her Majesty's reign for the dentists of England to perfect an institution that Sir James Paget had described as the finest dental school in the world.

The following is the List of Prize Winners:—Saunders Scholar, Mr. J. H. Badcock; Prize given by Messrs. Ash & Son, Mr. J. H. Badcock. *Metallurgy*.—1st Prize, Mr. J. H. Badcock; 2nd Prize, Mr. F. Lonnon; Hon. Certificate, Mr. A. W. Frost, Mr. C. R. Morley, Mr. B. Saul. *Mechanical Dentistry*.—1st Prize, Mr. G. Seymour; 2nd Prize, Mr. R. H. Bates; Hon. Certificate, Mr. H. A. Washbourn, Mr. A. W. Frost, Mr. C. R. Morley. *Dental Surgery*.—1st Prize, Mr. J. H. Badcock; 2nd Prize, Mr. C. R. Morley; Hon. Certificate, Mr. J. H. Colyer, Mr. R. H. Bates, Mr. H. A. Washbourn, Mr. W. H. Dolamore, Mr. F. A. Harsant. *Dental Anatomy*.—1st Prize, Mr. J. H. Badcock; 2nd Prize, Mr. W. H. Dolamore; Hon. Certificate, Mr. J. F. Colyer, Mr. F. A. Harsant, Mr. R. H. Bates, Mr. H. A. Washbourn, Mr. C. R. Morley. *Operating Prize*.—1st Prize, Mr. G. Seymour; 2nd Prize, Mr. A. R. Colyer; Hon. Certificate, Mr. C. R. Morley, Mr. H. Picton. *Students' Society's Prize*.—Awarded for Paper on Dental Anæsthetics to Mr. A. T. Croucher.

At the conclusion of the distribution, Professor Marshall delivered a short address, in which he warmly praised the work done in the school, and referred to the excellent opportunity for

study and practice afforded to the students by means of the patients at the London Dental Hospital, each pupil being enabled to see on an average four cases daily. In conclusion, Professor Marshall earnestly encouraged the students to do all in their power to maintain the status of their profession, which he said was daily growing in importance, and was already recognised as a distinct branch of surgery.

On the motion of Sir John Tomes, F.R.S., a hearty vote of thanks was accorded to Professor Marshall for his kindness in presiding.

A musical programme was then performed by Miss Amy Hickling, Mr. David Hepburn, Mr. Alfred Smith, Mr. R. S. Fairbank and Mr. Eric Lewis.

EDINBURGH DENTAL HOSPITAL.

THE Annual Distribution of Prizes to the students of this school took place under the presidency of Professor Chiene. The Dean's report was very satisfactory, the number of students being equal to former years.

The senior prize for Hospital Work was awarded to Mr. H. B. Eyard, and the junior prize to Mr. A. D. Cormack; Dental Anatomy and Physiology, Mr. Gordon Shiich; Dental Surgery and Pathology, Mr. H. E. Mahonie; Dental Mechanics, Mr. Gordon Shiich.

RESTORATION OF A NAME TO THE DENTISTS' REGISTER.

THE QUEEN *v.* THE GENERAL COUNCIL OF MEDICAL EDUCATION
AND REGISTRATION.

THIS was an application on behalf of Mr. H. F. Partridge for a *mandamus* to the General Council of Medical Education of the United Kingdom, to restore his name to the register of dentists kept under the Dentists' Act, 1878. The details of this case and an account of the trial were given in the previous number of the DENTAL RECORD, p. 320. The appeal was heard on August 1st, before the Master of the Rolls, Lords Justices Lindley and Lopes.

Mr. Kennedy, Q.C., and Mr. Muir Mackenzie, for the General

Council, said that the applicant, if his name were not erased, would be able to practise anywhere, even in Dublin, though his diploma had been taken away in Ireland. He might therefore, laugh at the College of Surgeons in Ireland. There had been no inquiry as to whether the applicant had been guilty of disgraceful conduct in a professional sense within section 13. That section applied to a case where the person still had a diploma. The Council were bound to erase his name from the register when his diploma was taken away, and no express provision to erase his name was necessary.

The Court dismissed the appeal, and in giving judgment

The Master of the Rolls said that the General Council had erased the applicant's name from the register simply upon the ground that his diploma had been taken away by the Royal College of Surgeons in Ireland, and without any inquiry by the General Council under sections 13 and 15 of the Dentists' Act, 1878. Whether they had power to do so depended upon the terms of that Act. Section 6, which provided as to the qualifications of a person entitled to be registered, dealt with the qualification at the moment of registration. "To be registered" meant "to be put on the register." Section 7 showed that was the meaning of those words. That disposed of the meaning attempted to be placed on Section 11. The first part of section 11 must apply to the time of putting the name on the register. Subsection 3 dealt with a "copy" of the register, and required a correct copy to be printed every year. Sections 12 and 13 dealt with alterations in the register itself. Under section 13 a person's name might be erased from the register where he had been guilty of (among other things) disgraceful conduct in a professional respect. The General Council exercised their powers of erasing names under sections 13 and 15. Those sections showed that the power of erasure was a judicial power given to the General Council and confined to those matters into which they could make inquiries—namely, those cases specified in section 13. If disgraceful professional conduct was proved, the Council must erase the name. The mere fact that the local medical body had struck him off their register and taken away his diploma was no ground for the General Council erasing his name from their register. The principle of law applicable was, that as the dentists' register was instituted by the Act of 1878, everything in relation to it must be

looked for in the Act alone. His Lordship added that the *mandamus* must go, but the fact of its going would not take away the power of the General Council to exercise their jurisdiction under sections 13 and 15, and if on inquiry the Council came to the conclusion that the applicant had, by breaking the condition imposed upon him by the local medical body, been guilty of disgraceful professional conduct (and if he wilfully broke the condition his professional conduct might be thought disgraceful), they would erase his name from the register.

The Lords Justices gave judgment to the same effect.

ON THE HOMOLOGIES AND SUCCESSION OF THE TEETH IN THE DASYURIDÆ,

WITH AN ATTEMPT TO TRACE THE HISTORY OF THE EVOLUTION
OF MAMMALIAN TEETH IN GENERAL.

By OLDFIELD THOMAS, British Museum (Natural History).

THE following abstract is from the *Proceedings of the Royal Society*:—The true homologies of the different teeth in the Marsupialia, and especially in the *Dasyuridæ*, have long been in a state of confusion, largely owing to their perplexing superficial resemblances to the teeth of the carnivora and other placentals, and to the incorrect homologies thereon founded. This confusion has been chiefly in regard to the premolars, of which some members of the family have two, others three, while generalised placentals have four, and it is therefore necessary to prove which teeth have been successively lost in order to find out the correct homologies of the remainder.

Firstly, as to which of the three premolars of such genera as *Thylacinus* and *Phascologale* have been lost in *Dasyurus* and *Sarcophilus*, each with only two—a study of the different members of the genus *Phascologale* shows that, judging by the great variability in size of the last premolar or pm.⁴ of the typical mammalian dentition,* which is sometimes even altogether aborted, it is this tooth that is the one lost in *Dasyurus* and *Sarcophilus*, the total loss of the changing tooth naturally accounting for the non-discovery of a tooth-change in these genera.

* Although the homology of this tooth with the pm.⁴ of Placentals, first made out by Professor Flower, has been called in question, there can be no doubt that it is entirely correct.

Next, since the original number of premolars was clearly four in the Marsupials as well as in the Placentals, it was necessary to find out which of these had disappeared in the ordinary three-toothed genera of the Polyprotodonts, and this has been able to be done by the fortunate discovery of a specimen of *Phascologale* in which there are four premolars on one side, the additional tooth being inserted between the ordinary first and second premolars. The missing premolar is therefore pm.², as shown both by this instance and by the relative positions of the teeth in other Polyprotodonts, the resulting premolar formula of *Phascologale* and

Thylacinus being P.M. $\frac{1.0.3.4}{1.0.3.4}$ and of *Dasyurus* and *Sarcophilus*

P.M. $\frac{1.0.3.0}{1.0.3.0}$ *

The milk dentition in several of the *Dasyuridæ* is then described, among others that of the Purbeck Mesozoic Marsupial *Triacanthodon serrula* (Owen), which is proved to have, as had been suggested by Professors Owen and Flower, a milk dentition identical with that of the modern Marsupials.

An attempt is then made to trace out the history of the evolution of mammalian teeth in general, and as a preliminary it is insisted (1) that the rudimentary tooth-change of the marsupials is not a remnant of a fuller one, but a low and early stage in the development of complete diphyodontism, a stage out of which the Eutheria have long ago passed; and (2) that, as maintained by Professor Flower, the milk teeth are the superadded and not the primary set.

It is then suggested that the process by which a milk tooth was developed consisted of two stages, firstly a preliminary retardation of the permanent tooth; and secondly, of the development of a temporary tooth in the gap in the tooth-row caused thereby; the retardation in the first case being useful for packing purposes in a large-toothed animal, while in a small-toothed form the same retardation, if present by inheritance, would cause a more or less disadvantageous gap, best filled by the assumption of a milk-tooth.

* This method of writing dental formulæ is recommended as showing not only the total number, but the homologies of the teeth, each of which has its own number in the series.

The first stage, or stage of retardation, appears to be still represented in the anterior upper incisors of many Polyprotodont Marsupials, and it is therefore believed that these teeth now represent the stage at which the ancestors of the Marsupials and Eutheria diverged from one another, a stage at which the further development of milk incisors was just commencing.

Following out this idea, it is shown how easily the transition from the Metatherian to the Eutherian stage of tooth-change may have taken place, a transition by the help of which a complete series of diagrams can be drawn up, following the history of each individual tooth, from the dentition of the earliest Mammals, homodont and monophyodont, as no doubt the unmodified Prototheria were, down to the varied forms of dentition, heterodont and diphyodont, existing at the present day.

All the orders of Mammalia fall easily enough into their places in the main line of this scheme with one exception, namely, the Edentata, in whose case the evidence all tends to prove the correctness of Professor Parker's suggestion as to their nearly direct derivation from the Prototheria, a suggestion that the characters of their teeth most fully support. On the same principles, therefore, as the main Proto-meta-eutherian line of tooth development is drawn up, a side branch, for which the name "Paratherian" is suggested, is made for the Edentates. Within that branch very little heterodontism has ever been developed, but otherwise the changes, except in the case of the as yet inexplicable dentition of *Orycteropus* have been of the same nature as those in the main line, the superaddition of a milk set of teeth in *Tatusia* being, as in the Meta- and Eu-theria, the last and most highly specialised development.

AMALGAM AND MATRIX.

By DR. FRANK W. LOW, Buffalo, New York.

WHATEVER may be urged for or against the use of the matrix in general, in operations for compound or crown approximal cavities, whether in bicuspid or molars, if amalgam is to be used as a filling material, the matrix ought to be considered as an indispensable adjunct, because in no other way can the contour of the tooth be so perfectly restored, while the introduction of the filling is converted from a complicate to a very simple operation.

The amalgam can be impacted and hardened by direct pressure, and so thoroughly burnished as would otherwise cause protrusion of the mass at the cervical walls; nor will there be any danger from mastication, even if put to use immediately upon completion of the operation.

By many who work amalgams of inferior quality, this last statement will be read with incredulity, and the objection will be raised that the removal of the matrix is liable to dislodge the filling. Let me detail a process which, if accurately followed, will both banish all doubts and overcome all objection:

The decay having been excavated and the cavity otherwise properly shaped, it is advisable, as a final precaution against the possibility of dislodgment, to make with a sharp fissure bur two marked dovetailed enlargements in the crown opening well back in the body of the tooth, one approaching towards its buccal, the other towards its lingual wall. When sufficient separation can readily be obtained, unless one may prefer to use the device invented by Dr. William B. Miller, the Jack's matrix should perhaps be chosen in preference to all others, and as two sets—one thick, one thin—are now devised, they will meet the exigencies of a majority of cases. However, if the teeth approximate so closely that sufficient separation seems impossible, or if the separation is too great and the matrix cannot be held in position by impingement against the adjoining tooth, then the choice of a suitable band matrix is indicated. The Ladmore-Bruton clamps and matrices (an English device which has the advantage over its American competitors to public favor, in that it is adjusted and tightened with a flexible key) and those devised by Dr. S. H. Guilford, are much alike, while the Loop matrices, invented by Dr. Frank Creager and by Dr. W. Pinney, more nearly resemble each other in the manner of their construction; and yet another, differing considerably from both the bands of Drs. Creager and Pinney, is the device of Dr. T. W. Brophy. These are each and all, in their several ways, excellent devices. He who has any one of them is pretty well equipped; he who has them all is truly fortified against any contingency.

To guard against the possibility of slipping, to insure perfect adaptation to the cervical walls, and to induce a slight additional separation for the easy removal of the matrix when the operation is completed, it is well to force a wedge of orange-wood (dipped in

copal-ether varnish and so sharpened as to conform to the V-shaped space between the necks of the teeth) in between the matrix and the adjoining tooth. A magnifying glass should be used to inspect the cavity as soon as the wedge is adjusted and excised to make sure of this perfect adaptation, for it is an all-important requirement to the finished work.

In mixing the amalgam, great care should be taken to combine the alloy with *pure* mercury in definite proportions, because the hardness of the plug, as well as the immunity from shrinkage, depends upon the perfect satisfaction of certain natural combining weights of the different metals with the mercury of amalgamation, so that either a lack of or surplus of mercury is disastrous to this perfect combination. The best method for mixing is that recommended by Dr. Thomas Fletcher, namely: "Put the amalgam in a glass mixing tube; cover the open end of the tube with the finger and shake briskly for a few seconds; work the resulting mass into little discs with a cylinder mould."

The writer invariably makes use of the little balance devised by Dr. Fletcher for combining amalgam in proper portions; and prefers to all others his platinum and gold alloy. The amalgams of other manufacturers may be equally good, but their proportions for perfect amalgamation should be determined and stated, so that they may be accurately weighed for combination as above recommended. No amalgam can be successfully used with a matrix that will not burnish hard as soon as the cavity is filled, and *no amalgam will allow of sufficiently hard burnishing* if moisture is allowed to come in contact with portions of it while being introduced. On this account it is well, even after the operation is completed, before removing the rubber dam or napkin, to varnish the finished plug with copal-ether varnish.

A most bright and beautiful lustre may be given amalgam (which in most instances remains for years) by reburnishing and polishing at a subsequent sitting, and no time is better spent, even by the busiest operator, than to beautify his work after completion.
—*The Dental Advertiser.*

INFLAMMATION OF THE LIPS AND MOUTH.

At a meeting of the Royal Medical and Chirurgical Society on June 14th, and which is reported in the *Proceedings* of the Society,

Mr. JONATHAN HUTCHINSON contributed a paper on a form of

"Inflammation of the Lips and Mouth," which sometimes ends fatally, and is usually attended by some disease of the skin. The paper contains the description of a disease (not, it is believed, previously recognised) in which superficial ulcerations occur in the lips and in various parts of the mouth, followed sooner or later by some form of skin disease, and tending to a fatal termination. The form of skin disease may vary, but the hands and feet are the parts usually affected, and the nails are especially prone to suffer. In some instances the eruption may consist of bullæ, which are followed by free papillary outgrowths. The patients attacked are usually in middle life, or in early senile periods.

No special antecedents can be alleged as the probable cause of the malady. Unless checked by treatment, the disease appears to run its course in about six months, producing death by exhaustion. There seems reason to believe that opium given in repeated doses will cure it, and that there is, at any rate in some cases, no tendency to relapse afterwards. All the best marked cases as yet observed have occurred in males, but in several milder ones the patients were women. Of the most characteristic, two were master tanners, one was a farmer, one a clergyman, and one a gentleman of no occupation. All these resided in the country. Careful inquiry has failed to support the suspicion that the disease might perhaps be due to contagion from animals. Of these five cases, two ended fatally and three in recovery. The patients who died were those first observed, and since the discovery of the signal efficacy of opium no case has ended in death. The observation as to the efficacy of opium was simultaneously made by the President of the Society, Mr. Pollock, and by the author, two different patients being at the same time under their separate treatment and recovering under this drug. Since that every case has yielded, if the dose of opium were sufficiently pushed. In one, however, the disease did not yield quickly, and for more than a month seemed likely to end in death. As regards permanency of cure, in one case the patient is known to be quite well four years after his recovery, in another there is reason to believe that such is the fact, and in a third a period of two years has elapsed. In two of the milder cases, occurring in younger patients, the disease has repeatedly relapsed.

A great variety of remedies had been tried without benefit before the use of opium was resorted to. In no single case has

there appeared to be any tendency to spontaneous improvement. In all the cases the inflammation of the lips and mouth took definite precedence of the skin symptoms, and in some the latter were very slight. It is not known that any case has as yet been obtained amongst the poorer classes of society. The author desired to abstain for the present from expressing any detailed opinion as to the causes or nature of the malady. He would, however, venture to suggest that it is allied to other forms of disturbed health attended by skin disease and occurring in early senile periods, such as certain peculiar varieties of psoriasis, pemphigus, lichen planus, and pityriasis rubra.

Mr. MACNAMARA referred to the case which had been under his care. There was no apparent reason for the ulceration and inflammation of the mouth which supervened on the sufferer's return home from India. The spleen and liver were somewhat enlarged. Emaciation and cachexia were already advanced, and although opium was ordered, it was probably not taken as prescribed, and therefore had not had a fair trial.

Dr. RADCLIFFE CROCKER said that so far as the mouth part of disease was concerned, the condition was new to him. He testified to the value of opium in chronic progressive skin affections in old people. Was the affection related in any way to the pemphigus vegetans of Neumann?

Mr. HUTCHINSON, in reply, thought the affection might be so related.

PASS LIST.

ROYAL COLLEGE OF SURGEONS, EDINBURGH.

DURING the July sittings of the Examiners, the following gentlemen passed the First Professional Examination for the License in Dental Surgery:—Harry Brooke Dew, Somersetshire; William Gray, Edinburgh; George William Welham, London; William Herbert Dennis, London; Henry Hepburn Chapman, Edinburgh; and David Alexander Cormack, Edinburgh.

Harry Evelyn Mahonie, Sheffield, passed the final examination, and was admitted L.D.S. Edinburgh.

HARVARD UNIVERSITY, U.S.A.

On June 29th, C. Fred. Wright, L.D.S. Eng., graduated D.M.D.

CORRESPONDENCE.

To the Editor of the DENTAL RECORD.

SIR,—Will you be good enough to allow me, through the medium of your journal, to record a phenomenal instance of the capriciousness of nature, and to ask a few questions relating thereto. Briefly, the case is as follows:—

I have a family of five children under my care, whose ages are 11, 9, 7 and $2\frac{1}{2}$ years and 14 months. The three elder (reared on cow's milk whilst infants) had excellent temporary teeth, and their permanent sets promise to be nothing inferior. The two younger were reared on Nestlé's Swiss Milk, and the elder of the two has already lost all his incisors, not a vestige of them visible above the gums, although the brown and carious roots are present. The teeth of the 14 month's child have now set up a similar process of exfoliation, so to speak—the enamel scaling and crumbling away, and the subjacent dentine softening and breaking down. Some months previous to my first seeing the children—at about the time when the pulps of the teeth of the $2\frac{1}{2}$ year child would have become involved—it appears he suffered great pain, and his lips and gums were much swollen, but the mother was told by her medical adviser that it was useless to consult a dentist whilst in that condition, and since I have known him he has experienced no further trouble.

Now, to what is the difference in the structure or development of these different teeth to be attributed? Can the Swiss milk have been instrumental in effecting the modification? If so, how and why? Will the premature loss of the incisors affect the second teeth? If so, in what manner?

Assuming that the youngest child will have to pass through a period of suffering like his brother, what will be the best course to pursue? They cannot be stopped; must they be extracted?

I might mention that I am assured the food was never much sweetened—that the mother was always well during gestation; in fact, both parents have always been robust and healthy; that, with the exception of what I have said, all the children have enjoyed perfect health, and have never even suffered from the diseases associated with infancy and childhood.

I should be gratified by having the above queries satisfactorily answered, as I am anxious to ascertain what cause there can be for this anomalous departure from what might have been anticipated, when considering the perfect development which the teeth of the elder children of the same family have undergone.

Yours, &c.,

F. A. B.

GOSSIP.

DR. E. H. BOGUE, one of the Secretaries of the Dental and Oral Section of the International Medical Congress, has resigned that office. Dr. A. M. Dudley, of Salem, Mass., has kindly consented to act, and all communications should henceforward be addressed to him.

MR. FRANCIS BOULGER, of Norwich, having injured his right hand in consequence of falling over some uneven ground on the

premises of the Great Eastern Railway Company, obtained at the Norfolk Assizes, on the 28th ult., £1,000 damages. Mr. Justice Grove consented to stay execution.

DURING a violent thunderstorm in the Tarbes district (France), on June 20th, a hailstone was found which contained a nucleus of gypsum which had clearly been worked, and no doubt been sucked up by a waterspout to a thundercloud, where it became incrustated with ice.

A CASE of a somewhat remarkable character, says the *Lancet*, is at the present time in the London Temperance Hospital, under the care of Dr. R. J. Lee. A girl, fifteen years of age, had the last molar tooth in the lower jaw on the right side removed about six weeks ago. No anæsthetic was administered. She was in perfect health at the time. Half-an-hour after the operation she began to yawn, and has continued to do so constantly since. One yawn succeeds another without interruption, and with an interval of two or three seconds. Galvanism had been tried without effect, and other remedies previous to admission into the hospital. Three days afterwards the yawning changed to sneezing, and recently she has suffered from constant and rapidly succeeding fits of sneezing, each of which paroxysms appears to begin with a yawn. She seems to have no power of controlling herself, or only to a very slight extent; and if she attempts to do so, the next sneeze is more violent.

THE Darwin medal has this year been awarded, at the annual meeting of the Midland Union of Natural History Societies, to Mr. E. W. Badger, of King Edward's High School, Birmingham, for a paper on the Monumental brasses of Warwickshire.

ACCORDING to the statements of Drs. Kleiner and Wettner, the trio of carnivorous plants indigenous to the British Islands must now be increased to a quinto by the addition of the Tooth Wort and the Alpine Bartsia. The former is found parasitic on the roots of the hazel; the latter is a rare plant found only in the north of England and in Scotland.

PRESTON will shortly be the possessor of a technical school, in which cotton spinning, designing, mechanical engineering, and

dyeing will be taught. It is to be endowed with £30,000, by the trustees of the deceased Mr. Phillips, who left nearly half a million to the district for philanthropic purposes.

TREPHINING appears to have been practised in Europe during the Neolithic period. This is the earliest example of operative surgery yet discovered.

THE death is announced, on June 18th, of Thomas Hall, L.D.S.I., Harrell Mount, Derby Park, Rock Ferry, aged 54. He was dental surgeon to the school frigate, H.M.S. *Conway*.

It is stated that the following gentlemen have been appointed officers in the section of Dental and Oral Surgery of the International Medical Congress for the United Kingdom:—J. Smith Turner, *Secretary*; T. H. Harding, C. Spence Bate, F.R.S. (England), William B. Macleod (Scotland), R. T. Stack (Ireland), *Vice-Presidents*.

MR. H. G. READ, M.R.C.S., L.R.C.P., L.S.A., L.D.S.Eng. has been appointed dental surgeon to the Metropolitan Hospital.

THE Editor of the *Independent Practitioner* writes :—There are even now some schools which make a pretence of complying with the demands of the National Association of Dental Faculties, but which nullify them in practice. There has been in the past villainous work done by dental schools which pretend to respectability, and which have connected with them men who stand high in the councils of the profession. These schools, pretending to regularity, have graduated foreigners who were utterly ignorant of our language. They have brought our diplomas into disrepute abroad, and made American dentistry a bye-word and reproach in foreign countries. Men claiming to be honourable men have practically sold diplomas for a few dirty dollars. They are becoming known, and it is time that their vile practices were yet more fully exposed, and they held up to the reprobation which they deserve. Now is the time for dentistry to put itself in line with real progress; to rid itself of the barnacles which cling to it for mere pelf or power, and to make every school what it should be.

THE great bell at Cologne Cathedral, whose solemn inauguration took place a few days since, will be known as the Kaiserglocke. It was named Gloriosa. Its weight is 26 tons 13 cwt., and its perpendicular height $14\frac{1}{2}$ feet. The clapper weighs $15\frac{3}{4}$ cwt. The diameter of the bell at the mouth is nearly $11\frac{1}{2}$ feet. Twenty-two cannon taken from the French, with 5,000 kilos of tin, were used in its manufacture. It was cast by Andreas Hamm, of Frankenthal, and £1,050 were paid for the casting.

A SAW has just been patented with a movable handle which can be set in any position and locked, so that it can be used close to a skirting, or in case of a plug driven into a wall, and in any position where hand space is limited.

TOWARDS the end of June, 1887, at Røros, in Norway, it snowed so heavily that sledges might have been used. Just before, the weather had been very warm for a long period. In Sweden several provinces were visited with terrific cyclones, which tore up trees and unroofed houses.

THE habits of the Emu (*Dromaius Novæ-Hollandiæ*) in nesting having been carefully studied, it is stated that the hens lay their eggs anywhere about in the grass; the cock builds the nest and rolls the eggs to it, the hen sometimes endeavouring to prevent him and to break them.

THE possibility of sulphate of copper passing from the grape to the wine after the application of that chemical as a remedy against mildew, has been investigated by Professor E. Pollacci. His conclusion is that it can only do so in the minutest quantities.

INOCULATION against yellow fever has been tried with some success. The microbe which is supposed to be the cause of this scourge of certain localities is called *Cryptococcus scanthogenicus*. It is introduced into the system by subcutaneous injection.

EVER since a flush of colour, the result of light action, was first seen on a Daguerreotype plate, the possibility of producing pictures in their natural colours has been one of the day-dreams

of the photographer. Thirty-five or more years ago the subject of Heliochromy was studied by Niepcé de St. Victor. His experiments resulted in the obtainment of pictures of the solar spectrum in its seven tints. These pictures were taken upon a silver plate chlorised by means of an electric current in a bath of various chlorides, the plate being one of the electrodes. The difficulty in rendering these results permanent was so great that they had to be guarded from the action of light, and were therefore looked at only as scientific curios, and the process fell into desuetude. During the past three years Mr. Carey Lee, of Philadelphia, has been investigating these conditions in the latent pictures formed on or in the photographic film. In studying the silver salt in this latent image he has found that, unlike the salt found in the fully-developed picture, it is not soluble in nitric acid, and further that it is a sort of molecular combination of chloride of silver (Ag Cl) and sub-chloride ($\text{Ag}_2 \text{Cl}$), the latter varying in quantity. This form of chloride, it appears, he has been able to prepare in the laboratory by the action of hot nitric acid on normal chloride of silver, the result being a *red chloride*, insoluble in nitric acid. This red chloride, when spread on a suitable paper, produces pictures of the solar spectrum and of stained glass designs in their proper colours. To this chloride Carey Lee has given the name of photo-chloride. It is probably the same compound as that which Niepcé found on his silver plate, and with which he and Becquerel, Poitevin, and others obtained the results which years ago ushered in the science of Heliochromy.

FORTY-FIVE or more years ago, a clock was exhibited in the window of a celebrated silversmith in Cornhill, London, which attracted much attention and caused much speculation on the means by which the hand—it had but one—was moved. The clock consisted of a ring of metal, 18 or 20 inches in diameter, upon which were engraved hours. From the upper part of the ring depended a glass rod of half-an-inch diameter. This reached to the centre of the circle, and had there a steel axis at right angles, upon which a metal arrow was free to move in a vertical plane. This was the hand. The portion which usually carries the feather had at its extremity a flat circular bob. For some years the secret was kept; at length an ingenious watchmaker

residing at King's Lynn found a key which unlocked the casket. Here it is. The bob contained the motive power—the works of an ordinary watch, which were attached to the inner back surface of the bob by the axis of the fusée—that is, the cone carrying the chain. On this axis as a centre, the works were carried eccentrically, increasing at every minute the distance from the centre on which the hand was balanced, until they reached their greatest elongation: the hand would then point to 12. From this position the works would be carried inwards and nearer to the centre until at the nearest point, when the hand would point to 6. Of these horological curiosities there have been many, all showing considerable ingenuity on the part of the constructors.

THE sexual condition of the flowers in the edible fig, and the means by which fertilization is effected, has been studied by Dr. Fritz Müller, Graf Solms, Laubach, and by our own countryman, Mr. King. These investigators have arrived at the conclusion that the process is effected solely by insect agency. So far there is perhaps nothing new, though most writers express their views so ambiguously that it is difficult to know what are their opinions on this curious process. The generally received statement that the male and female flowers of the fig are contained in the same receptacle, is shown by both Solms and King to be, if not incorrect, yet so imperfectly stated as to be of little value. King says, "the male and female flowers are borne on different plants;" he also says that the figs which contain the male flowers likewise contain female flowers, but that the office of the latter is not the perfecting of the ovules attached to them, and further that these figs do not develop into edible fruit. These figs he calls capri figs, others call them gall flowers, because they are at a certain time infested by a gall-producing insect—*Cynips psenes*. The larva of this hymenopter is nourished by the ovules, and after passing through its stages there issues forth, when the pollen of the male flower is ready to be shed, the perfect insect, which makes its way to the female fig, bearing the fructifying grains; but while they are the trāgers of the pollen they are unable to deposit their eggs in the perfect female flowers. We strongly suspect, if this account be correct, that these pollen-bearers are asexual, a parallel to the alternation of generation found among gall insects generally.

THE BARBER-DENTIST.—An American gentleman called at Bow Street Police Court on the 23rd ult. to tell Mr. Vaughan, the presiding magistrate, how he had been done. He said he went into a shop in the Strand to get shaved. He then had his hair cut and was shampooed, after which "the smooth-tongued chap" who waited upon him persuaded him to have the tartar removed from his teeth. To this proposition the American consented, and when that delicate—and possibly necessary—operation was performed, he professed extreme surprise at being charged seven shillings and sixpence, which he considered an "extortion." Of course Mr. Vaughan could only suggest that the applicant should have struck a bargain before having his teeth scaled. We should advise the innocent "American gentleman" to take his next complaint to Lord Young.—*Chemist and Druggist*.

INDIARUBBER which has become hard and brittle can be softened by steeping in ammonia water. Five minutes' to half-an-hour's immersion is required, according to the state of the rubber.—*Ibid*.

In a paper on "Experiments on the Sense of Smell in Dogs," by Mr. George Romanes, and published in Linnean Society's Journal, the author concludes that the experiments show that not only the feet (as these affect the boots), but likewise the whole body of a man exhales a peculiar or individual odour which a dog can recognize as that of his master amid a crowd of other persons; that the individual quality of this odour can be recognised at great distances to windward, or, in calm weather, at great distances in any direction; and that it does not admit of being overcome by the strong smell of aniseed, or by that of many other footprints.

PROFESSOR F. MAX MÜLLER contributes to *Nature* (July 14th) an interesting paper on "No Language without Reason—No Reason without Language."

DR. PARSONS SHAW, of Manchester, writes as follows to the *Archives of Dentistry*:—A case of the highest importance to medical men and dentists has just been decided in the Court of Queen's Bench (England) on an appeal from the decision of the Judge of the County Court of Salford, in an action brought by a legally "qualified" man to recover for professional services wholly

rendered by an assistant who was an "unqualified" man—that is, did not possess a legal right to practise for himself, but was considered fit by this qualified (?) man to see his patients. The County Court Judge decided that such an account could not be collected, and the Upper Court sustained the decision. Thus is exposed and swept away one of the shams of the men who are so clamorous for penal clauses in Dental and Medical Acts of Parliament. Under the pretence of protecting the public against incompetent men, although they have not got all they want, they have managed to prevent any but a "qualified" man collecting his accounts in a court of law. Having secured so much of a monopoly for themselves, in shameless contempt of all their pretensions, and of the interests of those they profess to guard, they turn round and employ these very same "unqualified" men as assistants at a small salary, and send them to their patients, who have the same fee to pay as if the employer went himself. The Court has now affirmed that if a man is declared by law not fit to practise by himself, the law must hold him unfit to practise in another man's name.

WE have received No. 3 of the first volume of *The Journal* of the National Fish Culture Association, edited by Mr. J. W. Willes Bund, M.A., F.L.S. This quarterly journal contains several articles, and a summary of current information, on fish, fish culture, and fisheries, much of which is interesting to even the general reader.

THE question, "Is the tendency of the shape of an amalgam filling to a sphere?" is answered in *Items of Interest* by Dr. Henry S. Chase, St. Louis. He says: I answer yes, if the amalgam is of silver or tin alone. But an amalgam composed of 50 parts silver, 50 parts tin, 5 parts antimony, and 5 parts copper, will not ball if packed without moisture. I have glass tubes $\frac{1}{4}$ inch diameter, in which are trial plugs, made six years ago, that show no signs of balling, even by the closest test. Their surfaces are still level with the edges of the tubes. Placed in red ink, or aniline in alcohol, no sign of leakage is shown. So simple a question is easily settled by experiment.

THE next (September) number of the DENTAL RECORD will, as hitherto, contain information relating to Dental Education.

THE DENTAL RECORD.

VOL. VII.

SEPTEMBER 1, 1887.

No. 9.

Educational Section.

SUGGESTIONS TO STUDENTS.

THE Professional Education of the Dental Student consists of :—

1. Apprenticeship, or instruction in Mechanical Dentistry, for a period of not less than three years.
2. Attendance on Lectures, &c., at a General Hospital and Medical School for two Winter and one Summer Sessions—eighteen months.
3. Also attendance at a Dental Hospital and School for two years.

The attendance at the General Medical and at the Special Dental Hospital and School may be carried on simultaneously, and completed in two years. This plan of work takes up the whole of the Student's time, and it is impossible for him to concurrently engage in any Mechanical or other employment.

Before commencing his Professional Education (or apprenticeship), the Dental Student must pass a Preliminary Examination in Arts. The examination most to be recommended is the Matriculation of the University of London. Passing that examination will enable the student subsequently to present himself for an University degree, should he desire to do so. A list of the several examinations recognised by the General Medical Council as fulfilling the conditions required by that body regarding Preliminary Education is to be found on page 384.

Any one who commenced his professional education before

the 22nd July, 1878, is exempt from the Preliminary Examination.

After passing a Preliminary Examination, the student must receive at least three years' instruction in Mechanical Dentistry under a registered Dentist. It should be distinctly understood that the Royal College of Surgeons of England consider those three years of instruction, whether in the form of serving articles, or apprenticeship to Mechanical Dentistry, or otherwise, as Professional Education; therefore, they follow the Preliminary Examination. (See foot note, p. 390.)

Having received a certificate of his Preliminary Examination, and commenced his Professional Education, either by apprenticeship or by hospital studies, it is necessary to register the same at the Medical Council Office, 299, Oxford Street, London, W. This must be done within fifteen days from the commencement of the pupil's professional studies. The beginning of such studies will not be recognised by any of the Qualifying Bodies as dating earlier than fifteen days before the time of registration.

Any one registered as a Medical Student must also register as a Dental Student, if he be such.

Having served his articles, the student may enter a General or a Dental Hospital, or both, and complete the curriculum of at least four years of study from the date of registration; after which he is eligible to be admitted to examination for the Dental License.

Though the possession of the License in Dental Surgery is necessary for a name to be entered on the *Dentists' Register*, the student is strongly recommended to obtain some additional qualification in Medicine, Surgery, and Midwifery. On the other hand, though a Medical, other than the special Dental qualification, entitles its possessor to practise Dentistry, yet the course of study for such does not include any Dental instruction. Therefore, to be a Dentist requires a more or less complete compliance with the Dental Curriculum.

It will be observed that the Curricula of the several Licensing Bodies differ somewhat from one another. The Curriculum of the Royal College of Surgeons of England

exceeds the minimum course of study recommended by the Medical Council by prescribing attendance upon a second course of lectures on Dental Anatomy, Dental Surgery and Dental Mechanics; so also does the Curriculum of the Royal College of Surgeons in Ireland, by requiring a course of Practical Physiology and an extra six months' General Hospital Practice, besides three examinations at different periods. The Royal College of Surgeons of Edinburgh, and the Faculty of Physicians and Surgeons of Glasgow, require only six, instead of not less than twelve, months' attendance at a recognised General Hospital, with clinical instruction.

The total amount of fees for the curriculum for the L.D.S. differs at the several schools, as shown below:—

	£	s.	d.
London (with London Dental)	73	12	0
London (with National Dental)	67	6	0
Birmingham	63	0	0
Liverpool	75	12	0
Manchester	73	2	0
Edinburgh	64	0	0
Glasgow	48	16	6
Dublin (Dental only)	31	10	0

In addition to the above fees there are £10 10s. for Diploma, and, say, £12 for books, instruments, &c, also any premium that may be paid for the necessary three years' articles.

REGISTRATION OF DENTAL STUDENTS.

The Registration of Dental Students shall be carried on at the Medical Council Office, 299, Oxford Street, London, W., in the same manner as the existing Registration of Medical Students—as hereinafter set forth—and subject to the same regulations as regards Preliminary Examinations.

Students who commenced their professional education by apprenticeship to Dentists entitled to be registered, or by attendance upon professional lectures, before July 22nd, 1878 (when Dental education became compulsory), shall not be

required to produce evidence of having passed a Preliminary Examination.

Pupils who have been articled to their fathers or to brothers—with whom money transactions would be nominal—shall, in all other respects, be considered to be in the same position in regard to registration as those pupils provided for in the first part of Section 57 of the Dentists' Act, who have paid premiums for instruction.

Candidates for a Diploma in Dental Surgery shall produce certificates of having been engaged during four years in Professional Studies, and of having received three years' instruction in Mechanical Dentistry from a registered Practitioner.

One year's *bonâ fide* apprenticeship with a registered Dental Practitioner, after being registered as a Dental Student, may be counted as one of the four years of Professional Study.

The three years of instruction in Mechanical Dentistry, or any part of them, may be taken by the Dental Student either before or after his registration as a Student*; but no year of such mechanical instruction shall be counted as one of the four years of Professional Study unless taken after registration.

The privilege provided by the first clause of Section 37 of the Dentists' Act, for persons whose Articles of Apprenticeship expired before January 1st, 1880, shall be extended to all whose Articles had begun two years before that period.

The commencement of the course of Professional Study recognised by any of the Qualifying Bodies shall not be reckoned as dating earlier than fifteen days before the date of registration.

Forms for Registration may be obtained at the office of the General Medical Council. No fee is required for registration as a Student.

PRELIMINARY EDUCATION.

REGULATIONS OF GENERAL MEDICAL COUNCIL.

No person shall be allowed to be registered as a Medical or a Dental Student unless he shall have previously passed (at one or

* See also foot note on page 390.

more Examinations) a Preliminary Examination in the subjects of General Education as specified in the following List :—

1. English Language, including Grammar and Composition ;
2. Latin, including Grammar, Translation from specified authors, and Translation of essay passages not taken from such authors ;
3. Elements of Mathematics, comprising (a) Arithmetic, including Vulgar and Decimal Fractions, (β) Algebra, including Simple Equations, (γ) Geometry, including the first book of Euclid, with easy questions on the subject-matter of the same ;
4. Elementary Mechanics of Solids and Fluids, comprising the Elements of Statics, Dynamics, and Hydrostatics ;
5. One of the following optional subjects ;
 (a) Greek ; (β) French ; (γ) German ; (δ) Italian ; (ε) any other Modern Language ; (ζ) Logic ; (η) Botany ; (θ) Zoology ; (ι) Elementary Chemistry.

The following is a list of Examining Bodies whose Examinations fulfil the conditions of the Medical Council as regards Preliminary Education, and entitle to Registration as Medical or Dental Student :—*

I.—UNIVERSITIES IN THE UNITED KINGDOM.

UNIVERSITY OF OXFORD :—

1. Junior Local Examinations ; Certificate to include Latin and Mathematics, and also one of the following optional subjects :—Greek, French, German.
2. Senior Local Examinations ; Certificate to include Latin and Mathematics.
3. Responsions.
4. Moderations.
5. Examination for a Degree in Arts.

UNIVERSITY OF CAMBRIDGE :—

6. Junior Local Examinations ; Certificate to include Latin and Mathematics, and also one of the following optional subjects :—Greek, French, German.

* Provided that, in all cases, the subject of Mechanics, as set forth in the foregoing clause 4, be shown to have been included in the Examination.

7. Senior Local Examinations ; Certificate to include Latin and Mathematics.
8. Higher Local Examinations.
9. Previous Examinations.
10. Examination for a Degree in Arts.

UNIVERSITY OF DURHAM :—

11. Examination for Certificate of Proficiency.
12. Examination for Students at the end of their first year.
13. Examination for a Degree in Arts.

UNIVERSITY OF LONDON :—

14. Matriculation Examination.
15. Preliminary Scientific (M.B.) Examination.
16. Examination for a Degree in Arts or Science.

VICTORIA UNIVERSITY :—

17. Preliminary Examination ; Latin to be one of the subjects.
18. Entrance Examination in Arts, to include all the subjects required.

UNIVERSITY OF EDINBURGH :—

19. Local Examination (Junior Certificate) ; Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects :—
Greek, French, German.
20. Local Examinations (Senior Certificate) ; Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects :—
Greek, French, German.
21. Preliminary Examination for Graduation in Science or Medicine and Surgery.
22. Examination for a Degree in Arts.

UNIVERSITY OF ABERDEEN :—

23. Local Examination (Junior Certificate) ; Certificate to include all the subjects required.
24. Local Examinations (Senior Certificate) ; Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects :—
Greek, French, German.

25. Preliminary Examination for Graduation in Medicine or Surgery.
26. Examination for a Degree in Arts.

UNIVERSITY OF GLASGOW :—

27. Local Examination (Junior Certificate) ; Certificate to include all the subjects required.
28. Local Examination (Senior Certificate) ; Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects :—
Greek, French, German.
29. Preliminary Examination for Graduation in Medicine or Surgery.
30. Examination for a Degree in Arts.

UNIVERSITY OF ST. ANDREWS :—

31. Local Examinations (Senior Certificate) ; Certificate to include English Literature, Arithmetic, Algebra, Geometry, Latin, and also one of the following optional subjects :—
Greek, French, German.
32. Local Examination (Junior Certificate) ; to include all the subjects required.
33. Preliminary Examination for Graduation in Medicine or Surgery.
34. Examination for a Degree in Arts.

UNIVERSITY OF DUBLIN :—

35. Public Entrance Examination.
36. General Examination at end of Senior Freshman year.
37. Examination for a Degree in Arts.

QUEEN'S UNIVERSITY IN IRELAND :—

38. Local Examinations for men and women ; Certificate to include all the subjects required by the General Medical Council.
39. Entrance or Matriculation Examination.
40. Previous Examination for B.A. Degree.
41. Examination for a Degree in Arts.

ROYAL UNIVERSITY OF IRELAND :—

42. Matriculation Examination.

OXFORD AND CAMBRIDGE SCHOOLS' EXAMINATION BOARD :—

43. Certificate to include the following subjects :—An adequate knowledge of English Grammar and Orthography, as shown in the course of the Examination, to the satisfaction of the Examiners, being held as conforming to the requirements of the Medical Council in regard to those subjects :—

- (a) Arithmetic, including Vulgar and Decimal Fractions ;
 - (b) Algebra, including Simple Equations ;
 - (c) Geometry, including the first two books of Euclid ;
 - (d) Latin, including Translation and Grammar ;
 - (e) Also one of these optional subjects :—
Greek, French, German.
-

II.—OTHER BODIES NAMED IN SCHEDULE (A) TO THE MEDICAL ACT.

APOTHECARIES' SOCIETY OF LONDON :—

44. Examination in Arts.

ROYAL COLLEGES OF PHYSICIANS AND SURGEONS OF EDINBURGH :—

45. Preliminary (combined) Examination in General Education.

FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW :—

46. Preliminary Examination in General Education.

ROYAL COLLEGE OF SURGEONS IN IRELAND :—

47. Preliminary Examination ; Certificate to include Mathematics.
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III.—EXAMINING BODIES IN THE UNITED KINGDOM, NOT INCLUDED IN SCHEDULE (A) TO THE MEDICAL ACT (1858).

COLLEGE OF PRECEPTORS :—

48. Examination for a First Class Certificate, or Second Class Certificate of First or Second Division, Algebra, Geometry, Latin, and a Modern Language, having been taken.

QUEEN'S COLLEGE, BELFAST :—

49. Matriculation Examination.

QUEEN'S COLLEGE, CORK :—

50. Matriculation Examination.

QUEEN'S COLLEGE, GALWAY:—

51. Matriculation Examination.

INTERMEDIATE EDUCATION BOARD OF IRELAND:—

- | | |
|------------------------------|--|
| 52. Junior Grade Examination | } Certificate in each case to include all the subjects required. |
| 53. Middle Grade Examination | |
| 54. Senior Grade Examination | |

ST. DAVID'S COLLEGE, LAMPETER:—

55. Responsions Examination, to include all the subjects required.

EDUCATIONAL INSTITUTE OF SCOTLAND:—

56. Preliminary Medical Examination.

IV.—CERTAIN INDIAN, COLONIAL AND FOREIGN UNIVERSITIES AND COLLEGES.

**REGULATIONS OF THE VARIOUS EXAMINING BODIES FOR
THE DIPLOMA IN DENTAL SURGERY.**

PROFESSIONAL EDUCATION REQUIRED BY THE
ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Candidates are required to produce the following Certificates:—

1. Of being twenty-one years of age.
2. Of having been engaged during four years in the acquirement of professional knowledge.
3. Of having attended, at a school or schools recognised by this College, not less than one of each of the following courses of lectures, delivered by lecturers recognised by this College, namely; Anatomy, Physiology, Surgery, Medicine, Chemistry, and Materia Medica.
4. Of having attended a second winter course of lectures on Anatomy, or a course of not less than twenty lectures on the Anatomy of the Head and Neck, delivered by lecturers recognised by this College.
5. Of having performed dissections at a recognised school during not less than nine months.

6. Of having completed a course of chemical manipulation, under the superintendence of a teacher or lecturer recognised by this College.
7. Of having attended, at a recognised hospital or hospitals in the United Kingdom, the practice of Surgery and Clinical Lectures on Surgery during two Winter Sessions.
8. Of having attended, at a recognised school, two courses of lectures upon each of the following subjects, namely :—Dental Anatomy and Physiology (Human and Comparative), Dental Surgery, Dental Mechanics, and one course of lectures on Metallurgy, by lecturers recognised by this College.
9. Of having been engaged during a period of not less than three years in acquiring a practical familiarity with the details of Mechanical Dentistry, under the instruction of a competent Practitioner.* In the cases of qualified Surgeons, evidence of a period of not less than two, instead of three years, of such instruction will be sufficient.
10. Of having attended at a recognised Dental Hospital, or in the Dental Department of a recognised General Hospital, the practice of Dental Surgery during the period of two years.

NOTE.—All candidates who shall commence their professional education on or after the 22nd July, 1878, will, in addition to the certificates enumerated in the foregoing clauses, be required to produce a certificate of having, prior to such commencement, passed the preliminary examination in general knowledge for the Diploma of Member of the College, or an examination recognised as equivalent to that examination.

Candidates who were in practice as Dentists, or who had commenced their education as Dentists prior to September, 1859—the date of the charter—and who are unable to produce the certificates required by the foregoing Regulations, shall furnish the Board of Examiners with a Certificate of Moral and Professional Character, signed by two Members of this College.

* Candidates may, however, pass eighteen months of the three years' instruction in Mechanical Dentistry *before* the date of their Registration as Students ; but four years must be given subsequent to the date of passing the Preliminary Examination, as set forth in clause 2, and also on page 384.

Together with answers to the following inquiries :—

- | Name | Age | Professional Address. |
|---|-----|-----------------------|
| If in practice as a dentist, the date of the commencement thereof. | | |
| Whether Member or Licentiate of any College of Physicians or Surgeons of the United Kingdom; and if so, of what College. | | |
| Whether Graduate of any University in the United Kingdom; and if so, of what University; and whether Graduate in Arts or Medicine. | | |
| The date or dates of any such Diploma, License or Degree. | | |
| Whether Member of any Learned or Scientific Society; and if so, of what. | | |
| Whether his practice as a Dentist is carried on in connection with any other business; and if so, with what business. | | |
| Whether, since 22nd July, 1876, he has employed Advertisements or Public Notices of any kind in connection with the practice of his Profession. | | |
| The particulars of Professional Education, Medical or Special. | | |
| The Board of Examiners will determine whether the evidence of character and education produced by a Candidate be such as to entitle him to examination. | | |

PROFESSIONAL EXAMINATION.

The Examination is Written, Oral and Practical.

The Written Examination comprises General Anatomy and Physiology, and General Pathology and Surgery, with especial reference to the practice of the Dental Profession.

The Oral and Practical Examinations comprise the several subjects included in the curriculum of professional education, and is conducted by the use of preparations, casts, drawings, and by operations, &c.

Members of the College, in the Written Examination, will only have to answer those questions set by the Section of the Board consisting of persons skilled in Dental Surgery; and in the Oral and Practical Examinations will be examined only by that Section.

A candidate whose qualifications shall be found insufficient will be referred back to his studies, and will not be admitted to re-examination within the period of six months, unless the Board shall otherwise determine.

Examinations will be held in January, June and October.

The Fee for the Diploma is Ten Guineas, over and above any stamp duty.

NOTE.—A ticket of admission to the Museum, to the Library, and to the College Lectures, will be presented to each candidate on his obtaining the Diploma.

SYLLABUS OF EXAMINATION.

In addition to the Special Examination by the Dental Section of the Board of Examiners, candidates are expected to answer questions in the written and *viva voce* Examinations on the following subjects:—

ANATOMY AND PHYSIOLOGY.

The names of the Bones, and of their more important parts and their articulations.

The names and position of the principal Arteries, Veins, and Nerves.

The form and relations of the Viscera of the Head, Chest, and Abdomen, and an elementary knowledge of their structure.

An elementary knowledge of the structure and properties of the principal tissues.

An elementary knowledge of the functions of Digestion, Absorption, Circulation, Respiration, Secretion, Motion, and Sensation.

The Surgical Anatomy and Physiology of the Organs of Mastication, Deglutition, Taste, and Articulation.

PATHOLOGY AND SURGERY.

Inflammation and its consequences.

The healing of Wounds.

The methods of arresting Hæmorrhage.

The union of Fractures.

The signs of Asphyxia, and the treatment of threatened death from Anæsthetics.

The injuries and diseases of the Jaws, Mouth, Fauces, and adjacent parts.

EDWARD TRIMMER, *Secretary*.

PROFESSIONAL EDUCATION REQUIRED BY THE ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

PRELIMINARY EXAMINATION.

Candidates for the Dental Diploma must produce evidence of having attained the age of twenty-one years, and will require to

produce a Certificate of having passed the Preliminary Examination in General Education required for the ordinary License in Surgery, or an examination equivalent to this, and recognised by the General Medical Council,—except in the case of candidates who shall have commenced their professional education previous to the first day of August, 1878.

PROFESSIONAL EXAMINATION.

Candidates will also be required to produce Certificates of having been engaged during four years in the acquirement of professional knowledge, and of having been during that period, or at some time previous to their examination, engaged for not less than three years in the acquirement of a practical knowledge of Mechanical Dentistry with a practitioner registered under this Act.

LECTURES AND HOSPITAL ATTENDANCE.

The following Lectures and other Courses of Instruction must have been attended by candidates for the Dental Diploma, at a recognised Medical School or Schools; and the number of Lectures in each of the general courses must correspond with those required for the Surgical Diploma of the College :—

Anatomy.—One Winter course.

Dissections and Demonstrations.—Nine months.

or

Dissections } Nine months.

and

Anatomy of Head and Neck } One course of Twenty Lectures.

Physiology } One course of not less than
Fifty Lectures.

Chemistry One Winter course.

Surgery One Winter course.

Medicine One Winter course.

Materia Medica One course of Three Months.

Practical Chemistry and
Merallurgy } One course of Three Months

Clinical Instruction in Sur-
gery at a recognised Hos-
pital. } One course of Six Months,
or
Two courses of Three Months.

In addition to these, candidates will require to have attended

the following Special Courses of Lectures and Instructions, in terms of the curriculum, and by teachers recognised by this College :—

Dental Anatomy and Physiology	} One course of each.
Dental Surgery and Pathology	
Dental Mechanics 	

Two years' attendance at a Dental Hospital or the Dental Department of a General Hospital recognised by the College.

Candidates who are Licentiates of this College, or who may be registered Medical Practitioners, will require to produce Certificates of Attendance on the special subjects only, and will be examined in these only for the Dental Diploma.

EXAMINATIONS.

The Dental Examinations shall be both Written and Oral, and be conducted in the same manner as the ordinary Surgical Examinations. These Examinations shall consist of two separate sittings, and be held subsequent to each period of the Ordinary Examinations, on such days as the College may appoint. Candidates must apply to the Secretary of the College on or before the Saturday preceding the Ordinary Examinations, and must then produce all the required Certificates of having passed the Preliminary Examination, and of having attended the Lectures and other prescribed courses of instruction.

SUBJECTS OF EXAMINATION.

The ordinary subjects of Examination will be Anatomy, Physiology, Chemistry (including Metallurgy), Surgery, Medicine and Materia Medica ; and the special subjects will be Dental Anatomy and Physiology, Dental Surgery and Pathology, and Dental Mechanics. Anatomy, Chemistry (with Metallurgy), and Physiology, will form the subjects of the first Examination ; Surgery, Medicine, Materia Medica, and the special subjects, those of the second.

TITLE AND DIPLOMA.

Those candidates who pass this Examination shall be entitled to the designation of Licentiate in Dental Surgery of the Royal College of Surgeons of Edinburgh, and shall obtain the Dental Diploma of the Royal College. Each candidate, before receiving

his Diploma, shall, in entering his name in the books of the College, sign the following declaration :—

I hereby promise faithfully to maintain and defend all the rights and privileges of the Royal College of Surgeons of Edinburgh, and to promote its interests to the utmost of my power. I promise, in the event of my admission as a Dental Licentiate of that College, to refrain from advertising or employing any other unbecoming modes of attracting business, and I shall not allow my name to appear in connection with any one who does so. I also promise to obey all the laws of the said Royal College, made or to be made.

FEES, ETC.

The fee for the Dental Diploma shall be ten guineas. Each candidate, for the first examination, shall pay to the Secretary of the College the sum of four guineas not later than nine a.m. of the Saturday preceding the ordinary examinations; and in the event of a candidate being unsuccessful, two guineas will be returned to him. Where the candidate is successful, the sum of four guineas will be considered as paid to account of the diploma. Each candidate for the second examination shall pay to the Secretary of the College the sum of six guineas, not later than nine a.m. of the Tuesday preceding the second examination; and in the event of his being unsuccessful, three guineas will be returned to him. No candidate will, if unsuccessful, be remitted for a shorter period than three months. These rules will apply to any subsequent rejection.

EXAMINATIONS SINE CURRICULO, UP TO DEC. 31st, 1888.

Candidates who were in practice before the first day of August, 1878, or those not in practice but who had commenced their apprenticeship as Dentists before the first day of August, 1875, and who are unable to furnish the Board of Examiners with the certificates of lectures and hospital attendance required by the foregoing regulations, shall fill in the schedule of application as follows :—

1. Full name, age and address of candidate.
2. Certificates of moral and professional character, signed by two registered Medical Practitioners.

3. The date of commencing practice or Apprenticeship as a Dentist, and whether, if in practice, such practice has been carried on in conjunction with any other business, and, if so, with what business.
4. Whether he has any Degree or Diploma in Medicine or Surgery, and if so, from what College or University, or other body, and at what time it was obtained.
5. The particulars of professional education.

The President's Council shall, on such information being afforded them, determine whether or not the candidate may be admitted to examination for the Dental Diploma, and such examination shall, with the exception of the preliminary examination, and the exemptions in favour of Registered Medical Practitioners, as before explained, be passed on the same subjects and in the same manner as is required for other candidates, and will confer the same privileges.

The following will be the periods of examination for the year 1887-88 :—

I. PRELIMINARY EXAMINATIONS IN GENERAL EDUCATION.

These examinations will be held in October, 1887, April, July and October, 1888.

II. FIRST PROFESSIONAL EXAMINATIONS.

On Tuesday, October 4, 1887.

On Tuesday, January 3, 1888.

On Tuesday, April 3, 1888.

On Tuesday, July 24, 1888.

III. SECOND PROFESSIONAL EXAMINATIONS.

These will take place after the conclusion of the first professional examinations, at each of the above-mentioned periods. They will generally be begun on the Thursday succeeding the day of the first examination, and in no case on an earlier day.

SYLLABUS OF EXAMINATIONS.

In addition to a particular acquaintance with Dental Anatomy, Physiology and Surgery, candidates are expected to possess a competent knowledge of at least the following general subjects of examination :—

ANATOMY AND PHYSIOLOGY.

1. The Skeleton in general: the anatomical characters and

articulations of the Bones; with the Muscles of the Inferior Maxilla and Upper and Lower Extremities.

2. Names and positions of the principal Blood-vessels and Nerves, and of the Viscera of the Chest and Abdomen.
3. General Anatomy of the Brain and Intercranial Nerves.
4. General knowledge of the functions of Circulation, Respiration and Sensation.
5. An Elementary knowledge of Histological Structures.

CHEMISTRY.

1. The Laws of Combination.
2. Sources or preparation and chemical properties of Oxygen, Hydrogen, Nitrogen, Carbon, Sulphur, and Chlorine.
3. A general acquaintance with the Chemistry of Potass, Soda, Ammonia, Iron, Lead, Gold, Copper, Zinc, Arsenic and Mercury.

MEDICINE, SURGERY, AND MATERIA MEDICA.

1. The nature and treatment of Inflammation, Hæmorrhage, Asphyxia, Syncope, Wounds and Fractures; along with an Elementary knowledge of Diseases and the practice of Medicine in general.
2. A general knowledge of the action of Narcotics, Emetics, Purgatives, Depressants, and Stimulants, with examples of the commoner substances used as each, and the modes of their prescription.

JOSEPH BELL, *Secretary*.

PROFESSIONAL EDUCATION REQUIRED BY THE FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

The regulations of the Faculty of Glasgow do not materially differ from those of the Royal College of Surgeons of Edinburgh.

The Dental Examinations will be held in October, January, April and July.

The *Second Examination* will take place on the two days following the First Examination.

ALEXANDER DUNCAN, B.A., *Secretary*.

PROFESSIONAL EDUCATION REQUIRED BY THE ROYAL COLLEGE OF SURGEONS IN IRELAND.

Every candidate for the License in Dentistry of the College shall produce evidence of having been registered by the General

Medical Council as a student in medicine. Certificates of study will not be recognised by the College if the date of commencement of the course to which the certificate refers is more than fifteen days prior to such registration.

Every Candidate for the License in Dentistry shall be required to pass a Preliminary Examination and three Professional Examinations.

PRELIMINARY EXAMINATION.

The regulations of the College which refer to the Preliminary Examination of the candidate for the Letters Testimonial shall apply to the candidate for the Dental License.

Candidates are strongly advised to pass in Physics at the Preliminary or Equivalent Examination.

PROFESSIONAL EXAMINATIONS.

The First and Second Professional Examinations shall be held in July and October of each year.

Should the Student fail to pass in July, he may present himself in October.

The Examination of each year must be passed before a new session can be entered on, but, in special cases, it shall be in the discretion of the Council of the College to permit the student, for what appears to them sufficient cause, to commence a new year of study, and subsequently present himself for a supplemental Examination.

FIRST PROFESSIONAL EXAMINATION.

The candidate is required, before admission to the First Professional Examination, to produce evidence of having been registered as a medical student by the General Medical Council, also to produce certificates of having subsequently attended—

Surgical department of a General Hospital, nine months.	
Winter courses	{ Practical Anatomy, with Demonstrations and Dissections.
	{ Physiology.
	{ Surgery.
	{ Chemistry.
Summer courses	{ Practical Chemistry.
	{ Practical Physiology.
	{ Materia Medica.

The fee for this examination shall be £5 5s. Candidates who are rejected will be admitted to re-examination on paying an additional fee of £2 2s.

The subjects and order of this examination are identical with those of the Second Professional Examination for the Letters Testimonial of the College.

SECOND PROFESSIONAL EXAMINATION.

The candidate is required, before admission to the Second Professional Examination, to produce evidence of having passed the First Professional Examination, also certificates of having subsequently attended—

Surgical department of a General Hospital, nine months.

Winter courses	{	Demonstrations and Dissections,
		Practical Anatomy.
		Surgery.
		Medicine.

The fee for this examination shall be £5 5s., and for re-examination, if rejected, £2 2s.

The subjects and order of this examination shall be identical with those of the Third Professional Examination for the Letters Testimonial of the College.

THIRD AND FINAL PROFESSIONAL EXAMINATION.

The Third Professional Examination shall be held in April, July, and October. The candidate is required, before admission to the Final Examination, to produce evidence—

- a. Of having passed the Second Professional Examination ;
or of having obtained a diploma in Surgery recognised by the College.
- b. Of having attended, subsequent to registration by the General Medical Council, the following courses of Lectures recognised by the College :—

Dental Surgery and Pathology	} Of each two courses.
Dental Mechanics	
Dental Anatomy and Physiology	} One course.
Dental Metallurgy	

- c. Of having attended for two years the practice of a Dental Hospital recognised by the College.

- d. Of having been engaged in acquiring a practical knowledge of Mechanical Dentistry, for at least two years, in a public Laboratory recognised by the College; or for at least three years under the instruction of a Registered Dentist. The candidate shall also submit a piece of mechanical work certified to be of his own making.

The candidate holding a diploma in Surgery recognised by the College shall be required to produce certificates of one course of each of the above special Dental subjects, and of half the Hospital attendance and half the Laboratory work required from other Dental students.

As this remission has been made on the understanding that the Qualified Surgeon shall devote his whole time to the Dental work, the special Dental courses, Hospital attendances, and Laboratory work required from him, must all be taken out after the date of his diploma in Surgery.

FEES.

The fee for the Final Examination shall be, in the case of Licentiates in Surgery of the College, and for Dental students, £7 7s. For re-examination, if rejected, £4 4s.

For candidates holding a Surgical diploma other than that of the Royal College of Surgeons in Ireland, £12 12s. For re-examination, if rejected, £6 6s.

SUBJECTS OF EXAMINATION.

Candidates shall be examined in—

1. Dental Surgery—Theoretical, Clinical, and Operative.
2. Dental Mechanics—Theoretical and Operative.
3. Dental Anatomy and Physiology.
4. Metallurgy and Physics.

ORDER OF EXAMINATION.

FIRST DAY (PRINTED QUESTIONS).

Two hours shall be allotted to this examination. Three questions each in Dental Surgery, Dental Mechanics, Dental Anatomy, Metallurgy, and Physics shall be given. One question at least must be answered on each subject.

Candidates who have already passed in Physics at the Preliminary or Equivalent Examination shall be exempt from this subject at the Final Examination.

SECOND DAY (ORAL).

Each candidate shall be separately examined on each of the subjects of the first day.

THIRD AND FOURTH DAYS.

(Operative Dental Surgery and Mechanical Dentistry).

On these days the candidate's knowledge of Clinical Dental Surgery and Practical Operative Dentistry, and of Clinical Dental Mechanics and Practical Mechanical work, shall be tested. Candidates shall be examined at Hospital, and in the Dental Laboratory, and shall be required to perform operations on the model, and to carry out such mechanical work as the examiner shall direct.

REJECTED CANDIDATES.

No candidates for second or subsequent examinations shall be admitted thereto who has not satisfied his examiners at previous examinations ; but all candidates who have passed any examinations shall get credit for the same when presenting themselves upon a subsequent occasion.

EXAMINATIONS SINE CURRICULO.

Candidates who were in practice before 1878, whose names are on the Dental Register, and who are unable to furnish the certificates required by the foregoing regulations, may be admitted to examination if they shall fill in the schedule of application as follows :—

1. The name, age, and address.
2. A certificate of his moral and professional character signed by two Registered Medical Practitioners and by two Registered Dentists.
3. The date of his commencing practice, and whether such practice has been carried on in conjunction with any other business, and if so, with what business ?
4. Any certificate he may have of general education, or degree in Arts or Medicine.
5. The particulars of professional education.

The schedule of application, containing these particulars, shall be sent to the Registrar of the College, at least three weeks before the date of the examination ; and the Council of the College shall then determine whether or not the candidate shall be admitted to examination for the Dental diploma. Such examination shall

comprise the same subjects, and be conducted in the same manner as is herein set forth in reference to the Second and the Final Professional Examinations.

FEES.

The Fee for this examination shall be £21 ; re-examination, if rejected, £10 10s.

DECLARATION TO BE TAKEN BY LICENTIATES.

The candidates entitled to receive the Dental diploma are required to attend upon such day as shall be notified to them, and to take a declaration.

They shall then sign the College roll, and shall receive their diplomas.

An enrolment fee of £1 1s. is payable to the Registrar of the College on the issue of the diploma.

These bye-laws shall come into effect from and after 1st day of August, 1884. But the Council of the College reserve the right of making such modifications, as may seem to them reasonable, in favour of students who shall have commenced their studies before that date.

REGULATIONS RELATING TO PROFESSIONAL EDUCATION AND EXAMINATIONS FOR THE M.R.C.S. & L.R.C.P.

SECTION I.

PROFESSIONAL EDUCATION.

The M.R.C.S., or the L.R.C.P., cannot now be taken separately ; and any candidate who desires to obtain both the License of the Royal College of Physicians of London and the Diploma of Member of the Royal College of Surgeons of England is required to comply with the following Regulations, and to pass the Examinations hereinafter set forth. [See Section II.]

Every such candidate who shall commence Professional study on or after the First of October, 1884, will be required, at the times prescribed in Section II. for the respective Examinations, to produce satisfactory evidence :—

1. Of having been Registered as a Medical Student by the General Medical Council. [See Regulations of the General Medical Council, page 384, also to be obtained of the Registrar, 299, Oxford Street, London, W.]

NOTE A.—Professional Studies commenced before Registration, except in the cases of Chemistry and Chemical Physics, Materia Medica, and Pharmacy, will not be recognised.

2. Of having been engaged in Professional Studies at least forty-five months, during which not less than three Winter Sessions and two Summer Sessions shall have been passed at one or more of the medical Schools recognised by the two Colleges. One Winter Session and two Summer Sessions may be passed in one or more of the following ways :—
 - (a) Attending the practice of a Hospital Infirmary, or other Institution recognised as affording satisfactory opportunities for Professional Study ;
 - (b) Receiving Instruction as a Pupil of a legally qualified Practitioner holding such a public appointment, or having such opportunities of imparting a practical knowledge of Medicine, Surgery, or Midwifery, as shall be satisfactory to the two Colleges ;
 - (c) Attending Lectures on one or more of the required subjects of Professional Study at a recognised place of instruction.
3. Of having received instruction in the following subjects :—
 - (a) Chemistry, including Chemical Physics.
 - (b) Practical Chemistry.
 - (c) Materia Medica.
 - (d) Pharmacy.

NOTE B.—The instruction in Practical Pharmacy must be given by a registered Medical Practitioner, or by a member of the Pharmaceutical Society of Great Britain, or in a Public Hospital, Infirmary, or Dispensary.

4. Of having performed Dissections, at a recognised Medical School, during not less than twelve months.
5. Of having attended at a recognised Medical School :—
 - (a) A course of Lectures on Anatomy during not less than six months, or one Winter Session.
 - (b) A course of Lectures on General Anatomy and Physiology during not less than six months, or one Winter Session.

- (c) A separate Practical course of General Anatomy and Physiology during not less than three months.

6. Of having attended at a recognised Medical School :—

- (a) A course of Lectures on Medicine during not less than six months, or one Winter Session.
 (b) A course of Lectures on Surgery during not less than six months, or one Winter Session.
 (c) A course of Lectures on Midwifery and Diseases peculiar to Women during not less than three months.

NOTE C.—A Certificate must also be produced of attendance on not less than Twenty Labours, which Certificate must be signed by one or more legally qualified practitioners.

- (d) Systematic Practical Instruction in Medicine, Surgery, and Midwifery, including :—

1. The application of Anatomical knowledge to the investigation of Disease.
2. The methods of examining various Organs and other Parts of the Body, in order to detect the evidence of Disease or the effects of Accidents.
3. The employment of Instruments and Apparatus used in diagnosis or treatment.
4. The examination of Diseased Structures, whether recent or in a Museum.
5. The Chemical Examination of Morbid products.
6. The performance of operations on the Dead Body.
7. Post-Mortem Examinations.

- (e) A course of Lectures on Pathological Anatomy during not less than three months.

- (f) Demonstrations in the *post-mortem* room during the whole period of attendance on Clinical Lectures.
 [See Clause 8.]

- (g) A course of Lectures on Forensic Medicine during not less than three months.

7. Of having attended, at a recognised Hospital or Hospitals, the practice of Medicine and Surgery during Three Winter and two Summer Sessions.

NOTE D.—No Metropolitan Hospital is recognised which contains less than 150, and no Provincial or

Colonial Hospital which contains less than 100 Patients.

A three months' course of Clinical Instruction in the Wards of a recognised Lunatic Hospital or Asylum may be substituted for the same period of attendance in the Medical wards of a General Hospital.

8. Of having attended at a recognised Hospital or Hospitals during nine months Clinical Lectures on Medicine, and during nine months Clinical Lectures on Surgery, and of having been engaged during a period of Three Months in the Clinical Study of Diseases peculiar to Women.

NOTE E.—These Clinical Lectures must be attended after the candidate has passed the Second Examination.

9. Of having discharged, after he has passed the second Examination, the duties of a Medical Clinical Clerk, during six months, and of a Surgical Dresser during other six months.

NOTE F.—These duties may be discharged at a General Hospital, Infirmary, or Dispensary, or Parochial or Union Infirmary, recognised for this purpose, or in such other similar manner as shall, in the opinion of the two Colleges, afford sufficient opportunity for the acquirement of practical knowledge.

10. Of having received Instruction in the practice of Vaccination.

NOTE G.—The Certificate must be such as will qualify its holder to contract as a Public Vaccinator under the Regulations, at the time in force, of the Local Government Board.

Students are required to attend Examinations which are held in the several Classes.

N.B.—Exemption from any of the foregoing Regulations can only be granted by the Committee of Management.

SECTION II.

PROFESSIONAL EXAMINATIONS.

There are three Professional Examinations, called the First Examination, the Second Examination, and the Third or Final

Examination, each being partly written, partly oral, and partly practical.

THE FIRST EXAMINATION.

The subjects of the First Examination are :—

Chemistry and Chemical Physics.

Materia Medica and Pharmacy.

Elementary Anatomy and Elementary Physiology.

A candidate may take this Examination in three parts at different times, or he may present himself for the whole at one time.

A candidate will be admitted to the Examination on Chemistry, including Chemical Physics, Materia Medica, and Pharmacy, on producing evidence of having been registered as a Medical Student by the General Medical Council, and of having complied with the Regulations prescribed in Section I., Paragraph II., Clause 3, *or he may take Materia Medica and Pharmacy as part of the Second Examination*; but he will not be admitted to the Examination on Elementary Anatomy, and Elementary Physiology, earlier than the end of his first Winter Session at a Medical School.

The Fees for admission to the First Examination are £10 10s.

THE SECOND EXAMINATION.

The subjects of the Second Examination are :—

Anatomy.

Physiology.

A candidate may present himself for Examination in either of these Subjects or Parts separately, or in both at one time.

A candidate will be admitted to the Second Examination after the lapse of not less than six months from the date of his passing the First Examination, on producing evidence of having completed, subsequently to registration as a Medical Student, eighteen months of professional Study at a recognised Medical School or Schools, and of having complied with the Regulations prescribed in Section I., Clauses 4 and 5.

The Fees for admission to the Second Examination are £10 10s.

THE THIRD OR FINAL EXAMINATION.

The subjects of the Final Examination are :—

Medicine, including Therapeutics, Medical Anatomy, and Pathology.

Surgery, including Surgical Anatomy and Pathology.
Midwifery, and Diseases peculiar to Women.

Questions on Forensic Medicine and Public Health will be included in the Third or Final Examination.

A candidate may present himself for examination in these Three Subjects or Parts separately or at one part.

A candidate will be admitted to the Third or Final Examination on producing evidence—

1. Of being Twenty-one Years of age.
2. Of having passed the Second Examination.
3. Of having studied Medicine, Surgery, and Midwifery, in accordance with the Regulations prescribed in Section I., Clauses 2 and 6 to 10.

The Colleges do not admit to either Part of the Third or Final Examination any candidate (not exempt from Registration) whose name has not been entered in the Medical Students' Register at least forty-five months, nor till the expiration of two years after his having passed the Second Examination.

The Fees for admission to the Third or Final Examination are £15 15s.

Every candidate who shall have passed the Third or Final Examination is, subject to the Bye-laws of the two Colleges, entitled to receive—

The License of the Royal College of Physicians of London,
and

The Diploma of Member of the Royal College of Surgeons
of England.

Forms of the required Certificates may be obtained of the Secretary, Mr. F. G. Hallett, of the Examining Board in England, Examination Hall, Victoria Embankment, London, W.C.

SPECIAL DENTAL SCHOOLS.

THE DENTAL HOSPITAL OF LONDON, LEICESTER
SQUARE.

DENTAL ANATOMY AND PHYSIOLOGY.

By Arthur Underwood, M.R.C.S., L.D.S.Eng.—On Wednesdays
and Saturdays, at 8 a.m., during the Summer Session.

DENTAL SURGERY AND PATHOLOGY.

By S. J. Hutchinson, M.R.C.S., L.D.S.Eng.—On Tuesdays and Thursdays, at 8 a.m., during the Summer Session.

DENTAL MECHANICS.

By Joseph Walker, M.D., M.R.C.S., L.D.S.Eng.—On Wednesdays, at 5 p.m., during the first half of the Winter Session.

METALLURGY.

By Prof. A. K. Huntington—On Tuesdays and Fridays, at 12 o'clock, during the first half of the Winter Session.

Fees for two years' Hospital Practice and the Lectures, £31 10s.

MORTON SMALE, *Dean*.

NATIONAL DENTAL HOSPITAL AND COLLEGE,
GREAT PORTLAND STREET.

DENTAL ANATOMY AND PHYSIOLOGY.

By Thomas Gaddes, L.D.S.Eng. and Edin.—On Tuesdays and Thursdays, at 6 p.m., during October, November and December.

DENTAL SURGERY AND PATHOLOGY.

By Willoughby Weiss, L.D.S.Eng.—On Tuesdays and Thursdays, at 6 p.m., during May, June and July.

DENTAL MECHANICS.

By Harry Rose, L.D.S.Eng.—On Mondays, at 7 p.m., during January, February and March.

DENTAL METALLURGY.

By W. Lapraik, F.I.C., F.C.S.—On Tuesdays, at 7.30 p.m., during January, February and March.

OPERATIVE DENTAL SURGERY.

By George Cunningham, B.A., D.M.D., L.D.S.Eng.—On Mondays, at 6.30 p.m., during November and December.

DENTAL MATERIA MEDICA.

By Charles Glassington, M.R.C.S., L.D.S.Eng.—On Tuesdays, at 7 p.m., during October, November and December.

DEMONSTRATIONS IN DENTAL MECHANICS.

By W. R. Humby, L.D.S.Eng.—On Wednesdays, at 7 p.m., during January, February and March.

THE ELEMENTS OF HISTOLOGY.

By Thomas Gaddes, L.D.S.Eng. and Edin.—On Wednesdays and Fridays, at 6 p.m., during May, June, and July.

Fees for two years' Hospital Practice and all the Lectures, £25 4s. Perpetual, £31 10s.

THOMAS GADDES, *Dean*.

OWEN'S COLLEGE AND THE VICTORIA DENTAL HOSPITAL, MANCHESTER.

Instruction adapted to the requirements of students preparing for the Dental Diploma of the Royal College of Surgeons of England and other licensing bodies is now given by Owen's College, in conjunction with the Victoria Dental Hospital, Manchester.

The Lecturers on Dental subjects are :—

DENTAL ANATOMY AND PHYSIOLOGY.

By Andrew M. Paterson, M.D., M.R.C.S.—On Tuesdays, at 11 a.m., and Fridays, at 12 noon, during the Summer Session.

DENTAL SURGERY.

On Mondays and Fridays, at 4.30, during the Summer Session.

DENTAL METALLURGY.

By C. H. Burghardt, Ph.D.—On Thursdays, at 2.30 p.m., during the Summer Session.

DENTAL MECHANICS.

By Thomas Tanner, L.D.S.Eng.—On Thursdays, at 4 p.m., during the Winter Session.

The fee for two years Dental Hospital practice is £12 12s.

The cost of the necessary courses for qualification, together with the Infirmary and the Dental Hospital practice, is £73 2s.

HENRY PLANCK, *Dean of Dental Hospital*.

QUEEN'S COLLEGE, BIRMINGHAM, AND BIRMINGHAM DENTAL HOSPITAL.

The teaching of Dentistry is now undertaken by the Queen's College, acting in association with the Birmingham Dental

Hospital and the Birmingham Clinical Board, so that Students may fully qualify themselves for the Dental Diploma of the Royal Colleges.

The Dental Hospital is centrally situated, near the College, and is open daily (Sundays excepted). The number of patients treated in 1886 was 11,700.

DENTAL ANATOMY AND PHYSIOLOGY.

By John Humphreys, L.D.S.I.—On Thursdays, at 5 p.m., during the Winter Session.

DENTAL SURGERY AND PATHOLOGY.

By Charles Sims, L.D.S.Eng.—On Fridays, at 5 p.m., during the Winter Session.

DENTAL MECHANICS.

By W. T. Elliott, L.D.S.Edin. & L., F.C.S.—On Wednesdays, at 5 p.m., during the Summer Session.

DENTAL METALLURGY.

By W. A. Tilden, F.R.S., D.Sc.—On Tuesdays, at 2.30 p.m., from October till Christmas.

A Composition Fee of Sixty Guineas, payable in one sum, or in two sums, viz. : Forty Guineas at the beginning of the first year, and Twenty Guineas at the beginning of the second year of studentship, admits to the full curriculum required for the Dental Diploma (inclusive of the necessary Hospital Practice). Any additional attendance will be charged for according to the general conditions.

JOHN HUMPHREYS, *Sec. to the Dental Board.*

UNIVERSITY COLLEGE, DOVER STREET, LIVERPOOL, AND DENTAL HOSPITAL, MOUNT PLEASANT.

The entire curriculum can be completed at these two Schools.

DENTAL ANATOMY AND PHYSIOLOGY.—By F. T. Paul, F.R.C.S.

DENTAL SURGERY.—By E. J. M. Phillips, M.R.C.S., L.D.S.Eng.

DENTAL MECHANICS.—By E. A. Councell, L.D.S.Eng.

DENTAL METALLURGY.—By J. Royston, L.D.S.Eng.

FEES FOR DENTAL HOSPITAL PRACTICE.—Five Guineas per annum for all Students who are not taking out the full curriculum ; Four Guineas for full Students at these schools.

COMPOSITION FEE.—A payment of Fifty Guineas on entrance, or in two equal instalments (one-half on entrance and the remainder within twelve months), entitles the Student to attendance on all Lectures and Demonstrations (Medical and Special) required for the License of the Royal College of Surgeons of England. The fees for the Practice of the two Hospitals amount to £23 2s. The total expenditure for the whole curriculum is £75 12s.

F. T. PAUL, *Vice-Dean*.

DENTAL DISPENSARY AND SCHOOL, OCTAGON, PLYMOUTH.

DENTAL ANATOMY.—By F. H. Balkwill, L.D.S.Eng.

DENTAL PHYSIOLOGY.—By C. Spence Bate, F.R.S., &c.

DENTAL MECHANICS.—By W. V. Moore, L.D.S.Eng.

The Fee for Lectures and Dispensary Practice is £23 2s.

E. G. BENNETT, *Hon. Sec.*

DENTAL HOSPITAL OF EXETER, BEDFORD CIRCUS.

Attendance on the practice of this Hospital is recognised by the Royal College of Surgeons of England as qualifying for their Dental Diploma. Pupils of any Member of the Staff, or other Registered Practitioner (being a Life or Annual Governor), are permitted to attend the practice of the Hospital, subject to the approval of the Medical Sub-Committee, on payment of Five Guineas annually to the funds of the Institution.

HENRY B. MASON, *Hon. Secretary*.

EDINBURGH DENTAL HOSPITAL AND SCHOOL, CHAMBERS STREET.

DENTAL ANATOMY AND PHYSIOLOGY.

By Andrew Wilson, L.D.S.Edin.—On Tuesdays and Fridays, at 8 p.m., commencing in November. The course will consist of Twenty-four Lectures.

DENTAL SURGERY AND PATHOLOGY.

By George W. Watson, L.D.S.Edin.—On Tuesdays and Fridays, at 8 a.m. during the Summer Session. The course will consist of Twenty Lectures.

MECHANICAL DENTISTRY.

By W. Bowman Macleod, L.D.S.Edin.—On Wednesdays, at 8 p.m., commencing in November.

PRACTICAL MECHANICS.

Assistant Demonstrator.—J. Stewart Durward, L.D.S.Edin. The Demonstrations will be spread over the two years of Hospital Practice, and will be given as occasion serves.

Fees: For Hospital Practice, £15 15s.; Lectures, £9 15s.; total, £25 10s. This does not include the fee of £2 4s. for second courses of Lectures required by the Royal College of Surgeons of England.

W. BOWMAN MACLEOD, *Dean.*

GLASGOW DENTAL HOSPITAL AND SCHOOL,
56, GEORGE SQUARE.

DENTAL ANATOMY AND PHYSIOLOGY.

By J. C. Woodburn, M.D., L.D.S.Glas.—On Wednesdays and Saturdays, at 8 a.m., during Summer Session.

DENTAL SURGERY AND PATHOLOGY.

By J. R. Brownlie, L.D.S.Eng.—On Tuesdays and Fridays, at 8 a.m. during Summer Session.

DENTAL METALLURGY.

By Rees Price, L.D.S.Eng. — On Wednesday Evenings, at 7 p.m., during Winter Session.

MECHANICAL DENTISTRY.

By W. S. Woodburn, L.D.S.Glas.—On Tuesdays, at 7 p.m. during Winter Session.

Fee for two years' Hospital Practice is £12 12s.; for the four courses of Dental Lectures, £3 3s. each.

TOTAL FEE for Special Lectures and Hospital Practice required by the curriculum is £23 2s., of which £15 15s. may be paid on entering, and £7 7s. at the beginning of the second year.

J. R. BROWNLIE, *Dean.*

DENTAL HOSPITAL OF IRELAND, YORK STREET, DUBLIN.

SUMMER SESSION.

DENTAL ANATOMY AND PHYSIOLOGY.—By Daniel Corbett, Jun.,
A.B., F.R.C.S.I.

DENTAL SURGERY AND PATHOLOGY.—By A. W. W. Baker,
M.B., Ch.M.

WINTER SESSION.

DENTAL MECHANICS.—By Theodore Stack, M.D., F.R.C.S.I.,
D.M.D.

METALLURGY.—By Charles Cameron, M.D., F.R.C.S.I.

In the Mechanical Laboratory each Student is allotted his
own bench, where practical instruction is carried out.

Total Fees, £31 10s.

THEODORE STACK, M.D., *Dean*.

GENERAL MEDICAL SCHOOLS.

BATHOLOMEW'S HOSPITAL, SMITHFIELD, E.C.

Fee for General Subjects for Students of Dental Surgery :—
First Winter, 31½ guineas; First Summer, 31½ guineas; or a
single payment of 63 guineas. Dr. NORMAN MOORE, *Warden*.

CHARING CROSS HOSPITAL, W.C.

The Composition Fee for Dental Students is £42 2s. This
may be paid in two instalments of £22 2s. and £20, at the
commencement of each Winter Session respectively.

Dr. J. MITCHELL BRUCE, *Dean*.

GUY'S HOSPITAL, BOROUGH, S.E.

Fee for attendance on the Hospital Practice and Lectures
required for the Dental Diploma of the College of Surgeons,
63 guineas, or in two annual instalments of 40 guineas and
23 guineas. The above fee does not include £1 10s. for Practical
Chemistry.

Dr. F. TAYLOR, *Dean*.

KING'S COLLEGE, STRAND, W.C.

No special arrangements are made for Dental Students.

Prof. CURNOW, *Dean*.

LONDON HOSPITAL, MILE END, E.

Composite Fee for Dental Students :—Hospital Practice and Lectures, £42. This does not include the Fee of £2 2s. for Practical Chemistry.

MUNROE SCOTT, *Warden*.

MIDDLESEX HOSPITAL, BERNERS STREET, W.

Students who intend to become Licentiates in Dental Surgery of the Royal College of Surgeons are admitted to attend the requisite Courses of Lectures and Hospital Practice on payment of a fee of 40 guineas, in one sum on entrance, or by instalments of £30 on entrance and £15 at the beginning of the second Winter Session.

A. PEARCE GOULD, *Dean*.

ST. GEORGE'S HOSPITAL, GROSVENOR PLACE, S.W.

Fee for General Subjects required for the Diploma in Dental Surgery, including Practical Chemistry, £55; payable in two instalments: First year, £30; Second year, £25.

Dr. WADHAM, *Dean*.

ST. MARY'S HOSPITAL, PADDINGTON. W.

Entrance Fee to the General Hospital Practice and Lectures required for the examination in Dental Surgery at the Royal College of Surgeons, England, £55; payable in two instalments:—First year, £30; Second year, £25.

GEORGE P. FIELD, *Dean*.

ST. THOMAS'S HOSPITAL, ALBERT EMBANKMENT,
S.E.

The Fee for attendance on the General Subjects required of Students in Dental Surgery is, for the two years, £55; or by instalments, £50 for the first year, and £10 for the second year.

G. RENDLE, *Secretary*.

UNIVERSITY COLLEGE, GOWER STREET, W.C.

No special arrangements are made for Dental Students.

Prof. BERKELEY HILL, *Dean*.

WESTMINSTER HOSPITAL, BROAD SANCTUARY, S.W.

The Fees for the General Surgical Practice and Lectures required for the Dental Diploma of the Royal College of Surgeons may be paid in one or two ways, viz. :—1. In one payment on entrance, £50. 2. In two payments of £32 10s. and £20, to be made respectively at the commencement of each academic year. These payments include the Library Fee, and entitle the Student to attendance on the Tutorial Classes.

Dr. DE HAVILLAND HALL, *Dean*.

SCHOOL OF MEDICINE, SURGEONS' HALL,
EDINBURGH.

The Fees for the General Subjects (including practice at the Royal Infirmary) required of Dental Students, according to the curriculum of the Royal College of Surgeons of Edinburgh, amount to £38 10s.

STEVENSON MACADAM, *Secretary*.

OWEN'S COLLEGE, MANCHESTER.

See page 409.

QUEEN'S COLLEGE, BIRMINGHAM.

See page 409.

UNIVERSITY COLLEGE, LIVERPOOL.

See page 410.

ANDERSON'S COLLEGE, GLASGOW.

The Fees for the General Subjects required of Dental Students, as prescribed by the curriculum of the Faculty of Physicians and Surgeons of Glasgow, amount to £25 14s. 6d. And the Fees at the Dental School for the special portion of the curriculum, including £12 12s. for Dental Hospital Practice, are £23 2s.—total, £48 16s. 6d.

Dr. A. M. BUCHANAN, *Dean*.

BRITISH DENTAL ASSOCIATION,
ANNUAL MEETING IN GLASGOW.

THE annual general meeting of the British Dental Association was held in the Hall of the Faculty of Physicians and Surgeons, Glasgow, on the 18th, 19th and 20th ult. Sir EDWIN SAUNDERS, F.R.C.S., President, occupied the chair, and there was an attendance of about 120 members.

The PRESIDENT, in opening the meeting for Association business, announced the resignation of Sir John Tomes from the office of President of the Representative Board of the Association. He was afraid they must accept this resignation as final. Sir John had been induced last year to withdraw his resignation for a year, but his inability to attend the meetings had, as he explained, rendered him unable to hold out a prospect of any longer being President. But, at the same time, he was quite ready on all occasions to give the Association his valuable advice, which they would esteem in all cases of difficulty, because no man, perhaps, was better able to advise when any questions of difficulty arose, from his long observation and experience of everything connected with the institution, and from the singleness of purpose with which he had, at all times, devoted himself to the interests of the Association.

The letter of resignation and a valedictory address by Sir John Tomes to the Representative Board having been read, the President moved, and it was resolved—"That this meeting accept with great reluctance the resignation of Sir John Tomes as President of the Representative Board of the British Dental Association, and desires to record its deep sense of the value of his services in the cause of dental reform and professional organisation, and especially of his vigilance during a long period of impending legislation in medical matters which has resulted in securing a full recognition and place for dental surgery in the recent and probably final Medical Amendment Act of 1886."

It was afterwards agreed that the vacancy caused by the retirement of Sir John Tomes should be filled up by the appointment of Mr. Smith Turner, who has hitherto acted as Vice-president of the Representative Board; and Mr. Felix Weiss was appointed Vice-president in room of Mr. Smith Turner.

Mr. F. CANTON, Treasurer *pro tem.*, reported that the balance in bank at the credit of the Association was £589 16s. 2d.

Mr. MORTON SMALE, Secretary, stated that the total number on the roll of the Association was 645, being an increase of 38 over last year.

It was agreed that the next meeting should be held in Dublin on the 23rd, 24th and 25th August, 1888.

Mr. Daniel Corbett, Dublin, President of the Irish Branch, was elected President-elect; and Mr. F. Canton was appointed Treasurer in room of Mr. James Parkinson, who had been obliged to resign on account of ill-health.

Sir EDWIN SAUNDERS, in his valedictory address, said the question of greatest moment to them was what had been the effect of the past year's operations of the Association; what was the record of its work, and to what extent had it fulfilled its purpose? Had it satisfied or fallen short of the expectations of the profession in whose interests it was established? He could not help thinking that the reports to which they had listened gave a very satisfactory answer to these questions. This phenomenal year, which had witnessed an unparalleled outburst of patriotism and loyalty, this jubilee year, when they were alternately filled with amazement at the fervour of attachment of all classes and conditions to the personality of our Sovereign, and at the benignity of nature in the unwonted affluence of sunshine with which our beloved fatherland had been favoured — would be remembered by the members of the Association as having been signalized by the formation of the Irish branch. This gratifying event, the consummation of which was greatly due to the prompt action of Mr. Smith Turner, Vice-chairman of the Representative Board, whose energy and unselfish devotion to duty had been displayed on many similar occasions, would, he felt sure, be regarded as a matter of sincere congratulation by the Association, at once as an undoubted accession of strength not only by the augmented number of members, but by the social position of the gentleman by whom their profession had been so well represented in the sister isle. For them he hoped the affiliation would be productive of freer intercourse, warmer friendships, more liberal judgments of each other, greater dignity and prestige, with a higher estimation of the profession on the part of the general and medical public, and all the social gifts and privileges which spring from united action for the common good.

The two great engines for raising the dental profession were

an educated public opinion and organised instruction in dental science ; and these were working steadily and surely for this end. If they looked back only some twenty years they could not fail to be struck with the real and substantial advance which had been made not only in the development and resources of the art, but in the social and educational status of those now entering its ranks. And it was in this direction that would be found the true and efficient means of at once freeing it from opprobrium and purging it from the contamination of the unworthy.

On the motion of Dr. JOHN SMITH, Edinburgh, seconded by Mr. CHARLES S. TOMES, London, the retiring President was awarded a vote of thanks for his services during the year.

Mr. J. R. BROWNLIE, President, then took the chair. In his opening address he said it was his pleasing duty to welcome the British Dental Association to Glasgow—to a city having associated with it memories which they must all be disposed to cherish, and memories, too, which, save for the lessons they taught, they could now afford to forget. He would remind them that they were now on what should be classic ground, in a neighbourhood possessing a special interest from having been the scene of the first essay in life of the man who had been fitly described as the father of the dental profession. In the near neighbourhood John Hunter was born, and in Glasgow he worked as a tradesman during his earlier years, before devoting himself to more congenial work, and in which he so distinguished himself. It was pleasant, he continued, to note the interest taken in them, the youngest relative, by the medical profession, as they saw it in the action of its representative institutions. Ancient seats of learning were interested in their progress, and medical schools were competing for the privilege of educating their youth.

The license in dental surgery was growing in number and in public appreciation. He knew not if it was the company Parliament decreed they should keep which had stimulated so many to take advantage of the *sine curriculo* provisions, but he knew that in this neighbourhood the possession of the license in dental surgery was increased from one within ten years anterior to the passing of the Act to 50 per cent. within ten years thereafter.

Amongst the more important results of legislation they must give a very prominent place to the British Dental Association. Formed to give effect to the spirit and the provisions of the Dentists'

Act, it was yearly drawing closer professional ties. It was bringing together those who might not otherwise have met, and under conditions which could not fail to promote the art and the interests of the dentist. But it would be to misrepresent the situation to make it appear that they had as yet great occasion to rest and be thankful. A first attempt at legislation would necessarily leave room for improvement. Already certain alterations had been effected with advantage, and it might be expected that from time to time opportunities would present themselves for further adjustment of the provisions of the Act.

Of medical titles at home and dental titles abroad there was no lack, and so long as they were legitimately acquired and used the additional information and experience they represented must prove a gain to their possessor and to the credit of the profession of which he was a member. But the medallion had its obverse. The most coveted distinctions had been imitated. They had not now to complain so much of absolutely base metal as of the extent to which it was alloyed. Surely two out of so many (25) dental diplomas granted in America was too small a proportion to be found deserving a place on their dental register. Probably they ought now to congratulate themselves that the issue of really counterfeit diplomas was at an end. In that respect some improvement had been effected. It was over a dozen years since they had in Glasgow an agency for the sale of bogus diplomas—since he was favoured with a visit by the accredited agent of one of these so-called American colleges, having full authority to examine *in absentia*, and to grant any or as many titles as might be wanted. This man's agency extended to granting a degree of doctor in divinity, medicine, dentistry, and some others, and the charge was moderate, considering the outlay usually entailed in the acquisition of such honours. So flagrant an abuse could not long survive. This "college" was suppressed, and it did not appear that such honours were now to be had on the like easy terms.

They had, however, something still to hope for at the hands of their Transatlantic brethren. They were still left to contend with the varying value of American dental diplomas, nor could they be content that the title conferred should acquire by contraction a fictitious value, that it should have one meaning in America and a different meaning here.

In conclusion, he said their Association had assumed a most

comprehensive title, and it had yet to make good its claim to it. The name included as a legitimate field of the Association's operations the whole of an empire on which the sun never sets. Were they to understand the term British as employed in its limited or its widest sense? His answer to that was that their sphere of action had been limited, and they might still increase within this limited sphere. But this could not be accomplished until they had taken possession of the wider area; and not till the Association was represented by branches wherever dentists were in numbers sufficient to combine for the purpose could they claim to be, in the fullest acceptance of the term, the "British Dental Association."

The reading of papers was next proceeded with, the first being on

THE HASTIE WATER MOTOR,

or the water pressure to be obtained in all towns in Great Britain and Ireland of above 10,000 inhabitants, with remarks in reference to the use of the Hastie motor in workrooms and surgeries, by W. Campbell, L.D.S.Eng., Dundee. This was read by the Secretary, Mr. Smale. In the course of the paper, Mr. Campbell gave his experiences in working the Hastie motor in his surgery. The machine had proved very serviceable, but was still capable of improvement. When a sufficiently perfect machine was obtained, motors, whether Hastie's or some other inventor's, would, he believed, be used by all dental surgeons, and would be found in all dental workrooms. For the proper working of the machine it was necessary to have a continuous and sufficient pressure of water. The paper closed with a list of the various water pressures to be obtained in the chief cities and towns in the United Kingdom.

CONTINUOUS GUM WORK WITH ANY FORM AND MAKE OF TOOTH, by James Cumming, L.D.S.Glasgow. Although they had made great strides of late in both surgical and mechanical dentistry, there seemed to be yet room for improvement. It was to what he thought was an improvement in a process in the latter branch of their profession that he would call their attention. Most of them had seen, and some had tried, the Verrier process of producing continuous gum facings. Probably all would admit that there was considerable difficulty and uncertainty in producing a satisfactory piece of

work of this kind by the present process. First of all, a particular kind of tooth must be used; secondly, when the work was finished, there was considerable warpage, sometimes entirely spoiling articulation; thirdly, the teeth get fused and made unsightly on the surface from being exposed to the great heat required to fuse the gum-facing; and, fourthly, there was the tendency of the facing to crack, even when the piece was being worn in the mouth, and without any apparent cause. The improvements he had been working out would certainly do away with the first three defects mentioned, and, to a great extent, if not entirely, with the fourth. In his process, which he explained at some length, the advantages were that a broken tooth could be replaced easily, and any form of tooth could be used. When all this could be done without the use of pure gold as a solder, and the teeth wholly untouched by the fire, they would surely agree with him that it should be the coming process of continuous gum-facing.

Specimens of the work were passed round for inspection, and an interesting discussion followed.

Mr. GORDON JONES, L.D.S.I., London, next read a paper on

A MORE EFFICIENT METHOD OF CONFERRING DENTAL APPOINTMENTS.

He protested against the general rule in provincial towns of conferring dental appointments in connection with institutions on gentlemen having either the most influence or largest practice, thus asking them to perform duties which they had not the time to discharge conscientiously.

THE MECHANICAL TRAINING OF DENTAL STUDENTS.

GEORGE CUNNINGHAM, B.A., D.M.D., L.D.S.Eng., Cambridge, read a paper on the above.

There might perhaps exist, he said, certain laboratories where complete and efficient mechanical training might be obtained, but he feared they were few and far between. If they put aside all questions of self-interest which they might have as instructors, they must admit that the present system of pupilage had its drawbacks as well as its advantages. His main proposal was that the whole of the time of the dental pupil should not be exclusively passed in the dental laboratory, but that, where suitable institutions existed, a tangible part of each day, or even alternate days, should

be spent in attendance at some practical and allied courses of manual technology or in a practical school of mechanics.

The conditions and the actual courses followed must vary according to the various opportunities afforded in the different parts of the kingdom. Mr. Morton Smale, he said, held that a practical examination in the mechanical department should form a part of the ordeal to be passed before the student obtained his coveted diploma. He trusted the Association would cordially support such a proposition, as thereby it would be the sooner carried into force. That proposition, however, seemed to him only another very strong reason why the dental student should be furnished with an opportunity of remedying the possible defects and deficiencies of his private pupilage by the optional and public course of one year in a practical technical school. Some such arrangement as he had just indicated would combine the advantages of the school system with that of the present form of pupilage, and certainly would do much to promote the efficiency of L.D.S. diploma, which, after all, must ever be the essential qualification for a thorough dental practitioner.

A long discussion followed the reading of the paper, in which Messrs. Smale, Pearsol, Gaddes, Smith, Woodburn, Wilson, Fothergill, Turner, Brunton, and Stack took part.

In the evening the President and Mrs. Brownlie held a reception of the members of the Association and their friends in St. Andrew's Hall, music and dancing adding to the enjoyment of the company.

FRIDAY, AUGUST 19th.

The business of the second day began by a meeting of the Benevolent Fund, the PRESIDENT, Mr. J. R. Brownlie, in the chair.

Sir EDWIN SAUNDERS, F.R.C.S., submitted the Treasurer's report, which showed that the income during the past year amounted to £369 6s. 4d. Of this sum £81 5s. 4d. was received from donations and £288 1s. from subscriptions, which, with £152 8s. 11d. in bank at the commencement of the year, made a grand total of £521 15s. 3d. There was expended during the year in benevolent allowances £180 11s. 10d., being £31 more than last year. At the present time the money in bank amounted to £210 13s. 4d., and on hand £24 15s. 1d. The income was £91 13s. 5d. greater than the previous year. The invested capital

now reached £863 5s., and last year it yielded an income of £20 4s. It must be most satisfactory to the subscribers to the fund to learn that the working expenditure for the year amounted to only £5 5s.

Mr. S. J. HUTCHINSON read the Secretary's report. It stated that the general business brought before the Committee during the year had been on the increase compared with past years. The number of children who were being educated at the expense of the fund was eleven.

THE VALUE OF ANTISEPTICS IN DENTAL SURGERY,

by E. Lloyd Williams, M.R.C.S., L.R.C.P., L.S.A., L.D.S.Eng., London.

He made no apology for introducing this subject before the Association, because he was convinced of its importance, not only in its purely scientific aspects, but more particularly in its practical bearing upon the every-day work of modern dentistry; and to the latter consideration he intended addressing himself exclusively. It would be his endeavour to touch upon the broad principles which should rule over their practice, and to suggest a few special points of treatment which had been found valuable, rather than to formulate any hard and fast laws or dogmatise upon pet theories and particular methods.

The debt of modern surgery to Sir Joseph Lister was difficult to gauge; but they were apt to lose sight of the fact that they owed less to what was known as strict "Listerism" than to the great doctrine of cleanliness which underlay all the teaching of that eminent surgeon. The great principle which regulated all operations and which had been the very foundation of success was absolute surgical cleanliness. He feared that as dental surgeons they had even yet scarcely grasped the importance of that principle.

It was true that their sphere of surgical work was limited, and that they were concerned for the most part with hard tissues, which they looked upon as being comparatively indifferent to external conditions; but they must not forget that even in the simplest operation they had to do with living material, not to speak of those branches of their work where they were brought face to face with ordinary surgical conditions, and when the result of their treatment was wrapped up with the constitutional welfare or woe of their patients. Nature stood more insults in the mouth

than in any other part of the body, and her long-suffering had admitted of much reckless treatment with comparative impunity. There was probably no operation on any part of the human body commensurate with that of wrenching a tooth from its bony socket where the repair was so rapid and the after effects so slight. If this were not so they should probably approach the mouth with a far greater degree of caution, and should employ every possible antiseptic precaution for procuring a minimum of local and constitutional disturbance. But it yet remained to be proved how far they could improve upon present results by being more cautious, and he felt confident that in special cases antisepticism must lead to more brilliant results if carried out with thoroughness.

There was another side to the question which must not be lost sight of. It was well for them that there were so few recorded cases of inoculation from the mouth, but that was no reason why they should employ dirty instruments. Cleanliness, then, should be an elementary but essential principle of their practice. All their instruments should be not only clean, but, where at all probable to come in contact with the soft tissues, absolutely aseptic.

There were other ways in which antiseptics might prove useful in dental work. The commonest operation which they had to perform was the preparation of cavities for the insertion of fillings, and there was always a septic condition of the tissue to be contended with. In difficult cavities these disinfectants must be of value. Speaking of the power of absolute dryness to protect susceptible bodies from putrefaction, he said he believed the use of the hot-air syringe was one of the operative reforms which was most to be desired. The air itself could be rendered aseptic by dropping into the rubber bulb of the syringe a few drops of eugenol or eucalyptus oil. As a further precaution, any unsound dentine left in the immediate neighbourhood of the pulp, having been thoroughly dried, should be painted with an antiseptic varnish and then firmly dried with a current of warm air. Mr. Williams concluded with a reference to the filling of dead teeth and the advisability of rendering even temporary fillings antiseptic.

Mr. A. KIRBY, L.D.S.Eng., Bedford, read an interesting paper on

THE DENTAL ASPECT OF PUBLIC HEALTH,

by George Cunningham, B.A., D.M.D., L.D.S.Eng., Cambridge.

The efficient treatment of so great a question must no longer be left in the hands of a few, no matter how energetic they might be, and his object was to suggest some "plan of campaign" which, after due discussion and approval, would receive the weight and influence with which the corporate and united action of their Association could imbue it. Every one recognised the fact that the diseases with which the dental practitioner dealt did not directly contribute to the death-rate, and that they were neither infectious nor contagious. Hence, doubtless, arose the utter indifference of the community with regard to them; nor would that indifference be removed until the contributory and indirect influence which they had on the death-rate was better understood.

The fact of State medicine being possible marked an epoch in which some sanitary rules received a general consent, and indicated an advancing civilisation. Was it too much to demand that State medicine should include State dentistry? He thought not. It was both the duty and the interest of the State to protect the helpless child from the results of dental as well as other disease, whether arising from the ignorance, the neglect, or the incapacity of the parents to provide the necessary treatment. In this consideration the very important fact should be recognised that from a lack of attention in the period of their youth men and women of the future were allowed to grow up with the inevitable certainty of future suffering, a large proportion of whom could only be radically treated between the ages of from ten to fifteen years. This naturally brought them to the consideration of Mr. Fisher's contention for the compulsory attention to the teeth of school children; and no intelligent reader, whether professional or otherwise, could but admit that he had succeeded in proving his case. Some would be inclined, perhaps, to scout the proposition of compulsory attention as visionary and Utopian, while others, admitting the advantages of such a scheme, might think they disposed of the question by stamping it as rank socialism. Again, many hearty sympathisers with this great project were at once taken aback by the economic difficulties of its institution. It was no use disguising the fact that this was a most serious aspect of the question. Everyone would be quick to recognise the increased

charge upon expenditure, but comparatively few had the power that they possessed of realising that it would be rather a mere transfer of liability already incurred in some other way, if not absolute saving of expenditure in other directions. The question might indeed be postponed for a time, but a sense of patriotism should urge them on to be the leaders rather than followers in a movement which time itself would hurry on.

Without referring to the action which some of the American dental societies had taken in promoting attention to the teeth of school children—in France, where no powerful association such as theirs existed, measures had been taken for the inspection and care of the teeth of children in the schools of Paris—he would ask them for a minute to consider how this important matter affected the services. There could be no doubt whatever that the Army Medical Department recognised the advisability and the necessity of remedial treatment other than that by mere extraction. If this were not the case, no provision would have been made for the supply of tooth-stopping and scaling instruments. The nature of the provision, however, was so absurd, that they were doing a service alike to the soldier, the army surgeon, and to the already heavily-burdened taxpayer in calling attention to the fact. Who until the other day ever supposed that gold foil was provided for the filling of the soldiers' teeth ; but did any army man ever know of the gold foil reaching the mouth of Tommy Atkins? In these days of Government inquiry, it might not be uninteresting to find out something about this misapplication of the nation's funds, for as experts they recognised the utter impossibility of properly manipulating not only the gold foil, but the amalgam and gutta-percha also provided, with the absurd equipment of three scalers and stoppers, and three excavators and roseheads!

Nor was that all. Not only were the materials provided absurd, and the equipment utterly inadequate, but the army regulations only provided for one such case being kept at headquarters of each military district. The least intelligent inhabitant of Glasgow would see the absurdity of the provision when he knew that the whole of Scotland constituted but one military district. But even were the materials, the instruments, and the distribution of the equipment all that they could desire, what was the use of it all if the army surgeon had had no training in necessary manipulative skill. He could not help feeling that, now the

attention of the department had been called to this very important question, they should recognise and put in force the power they undoubtedly possessed of requiring all the army medical candidates to produce evidence of having received at least an elementary training in dental surgery. He concluded by submitting the following resolution :—

“ That this meeting is of opinion (1) that wherever the State provides medical services dental services should be provided for as an essential part of such medical provision ;

“(2) That, having regard to the great importance of securing competent attention to the teeth of the army and navy, the Representative Board should consider the advisability of urging the Government to make suitable provisions to that end ;

“ And (3) that, considering the compulsory attention to the teeth of school children would be a national gain, the Representative Board should be empowered to further the matter in any way they deem most fit.”

The resolution was adopted.

During the afternoon a number of demonstrations were given at the Dental Hospital, George Square.

Mr. Kirby exhibited an electric mallet and engine. The apparatus was supplied with current from a set of secondary batteries manufactured and charged by Messrs Muir, Mavor and Coulson, electric light engineers, Glasgow. These cells require almost no attention further than recharging when run down.

The Hastie motor was shown in work.

Mr. Gordon Jones described a method of treating alveolar abscess.

Mr. Howarth showed the working of his articulator.

Mr. E. Lloyd Williams filled a cavity in a lower molar.

Mr. Coxon exhibited a series of regulation cases, and also a means of shutting off the gas of the Vulcanizer.

Messrs. Ash & Son and the Dental Manufacturing Co. had each a display of instruments and apparatus.

In the evening the annual dinner of the Association was held in the Grand Hotel, Charing Cross. Mr. J. R. Brownlie, President, occupied the chair, and Mr. J. S. Woodburn and Mr. Rees Price acted as croupiers.

The Lord Provost of Glasgow, the President of the Faculty

of Physicians and Surgeons, and other distinguished visitors were present, and there was also a large attendance of the members of the Association.

Saturday, the 20th, was devoted to pleasure. A large company visited the shipbuilding yard of Messrs. Denny, at Dumbarton, where, before leaving, a most hospitable repast was provided by the firm. After viewing the works the members of the Association and their friends were entertained by the Scottish Branch. A sail by steamer down the Clyde to the head of Loch Long and back, with a good luncheon on board, terminated another successful meeting of this representative Association.

GOSSIP

THOUGHT without words—on the tip of the tongue.

SLANG terms, says the "Autocrat of the Breakfast Table," are blank cheques drawn on a bankrupt intellect.

FIFTY years ago the first electric telegraph was set up. The first five-needle instrument of Cook and Wheatstone required five wires to transmit five words per minute, now five wires can transmit 2,500 words in the same time. The rate of working between Dublin and London has gone up from 50 to 462 words per minute. One cable can now do the work of ten.

INVESTIGATORS who have studied carefully the music of Nature tell us that the cuckoo gives out successively two very distinct musical sounds, and that the interval between those sounds varies from about two to five semitones. Early in the season, with a good voice, a bird gives notes about a tone apart, while later in the season the interval will be a fourth, and as the change goes on gradually, they will pass through a minor third and then through a major third, but the exactitude is all a matter of chance.

M. GAUTIER, a French chemist, states that he has found the germs of tuberculosis in the wines of the country. These germs, he says, are derived from the defibrinated blood used as a clarifier. It may be so, but we have yet to see it demonstrated that the bacillus of tuberculosis exists in the blood. Hitherto the germ has only been found in the tissues. It is only in the young and poor wines that there lurks the enemy.

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No. 10.

IMPROVEMENTS IN A WATER MOTOR FOR THE DENTAL ENGINE.

By GURNELL HAMMOND, L.D.S.Eng.

As we are all interested in the best means of driving our burring-engines, I would here draw attention to some improvements on a small water motor for dental use, together with an invention of mine for starting, stopping, and regulating the speed from 100 to 4,000 revolutions a minute; also a simple upright arm that I have devised to connect the motor with the engine arm, by means of which the greatest lateral movement can be obtained. I more believe than with any other fixed engine hitherto produced, enabling it to be used on either side of the chair. I have had it in constant use more than two years; it has never failed me once, nor has there ever been the slightest hitch in its working during that period.

Having for the last ten or twelve years tried every small motor (including steam and hot-air engines), and having spent much time and money on dynamos and primary batteries, and indeed made or tried almost every electro-motive engine and voltaic cell that is known, with more or less success (generally less), owing to the trouble, expense, nuisance from fumes, &c., I resolved to again turn my attention to water, and hearing that Messrs. Ash had just fitted up a small water motor which was said to drive the dental engine, I lost no time in obtaining one, but found, as usual, it did not quite come up to my expectations; for although it was a nice simple little motor in itself, there was no way of controlling its speed or satisfactorily connecting it with the dental engine arm.

I also found that the water pressure from a top cistern of a very high house was not sufficient to make it do the very hard work required of it when hard enamel had to be cut out, and that it was like all other "sewing machine" motors, not quite strong enough for dental purposes.

However, I got the water company to give me a special

supply (constant pressure) from the main, and I slightly enlarged the jet, by which I succeeded in getting enough power.

There was still no way of regulating the speed except by a common tap, which, of course, was out of the question, so I made a small egg-shaped valve to exactly fit the reverse side of the bore

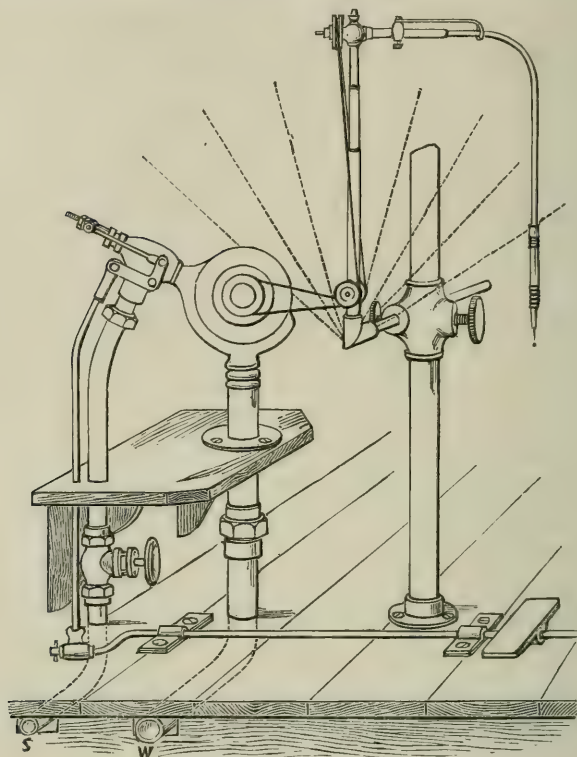


FIG. 1.

of the jet, as shown in Fig. 1. This I ground in and fixed to a long steel rod, which I made to pass through a stuffing-box, in a small T-shaped chamber attached to the inlet pipe of the motor. (See Fig. 1). This rod is worked up and down, opening or closing the aperture (and so exactly controlling the quantity of water thrown on the wheel) by a system of levers, connected by a vertical rod moved by a crank on the floor. This crank (see Fig. 1) is at the end of the horizontal shaft which passes to the right side of the chair and carries two small foot-plates.

The most convenient place for these plates is one on each side of the operating chair, so that the slightest rocking movement of the operator's foot, will at once start, stop, or regulate the

speed to the greatest nicety. The plates (and therefore the valve, will remain stationary in any position after the foot is removed, so that the engine can be left working or not as desired without any further attention.

The upright arm, carrying the White's engine arm (with a slightly larger wheel), is provided with a spiral spring in the top joint, to maintain the pulley from the motor at the same degree of tension, when the ascending arm with the small wheels is moved to either of the positions indicated by the dotted lines in Fig. 2. This supporting arm is bent at a right angle, and passes through

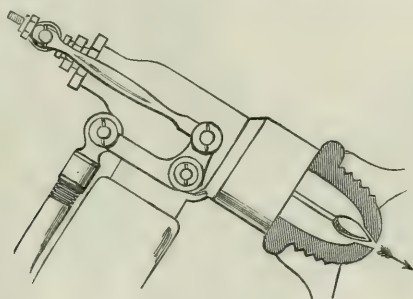


FIG. 2.

a clamp (double), where it is held in any position by a "set screw," so as to enable the engine to be used on either side of the chair; and, indeed, it can be brought into an almost horizontal position so as to allow the drill to be used nearly straight up, which direction is sometimes very useful for the upper teeth, and cannot be obtained by any other arm that I have seen.

The double clamp mentioned above is attached to an upright pillar carrying my bracket table on the left side of the chair, a very simple one I made, and prefer to any other. The small pipe with a tap above the motor is a "saliva pump" which is attached to it.

EXTRACTS FROM LECTURES ON OPERATIVE DENTAL SURGERY

(Delivered at the National Dental College.)

By WILLIAM ST. GEORGE ELLIOTT, M.D., D.D.S.

(Continued from page 300.)

As the natural tendency is towards improvement, I have no doubt that in time we will see a motor of some kind in the surgery of every dentist who makes any pretence of keeping up with the times. There is no question of the advantage, and as has been the case with the dental engine so with the motor, it will become

generally adopted, particularly as the Otto people have recently introduced a still smaller motor, called the Domestic, of about one-half the power of my five-man power, and costing £35, with the same economical consumption of gas that characterises the Otto principle. My own engine costs me for three months' constant use, in March, April, and May last, on an average of five hours a day, some 1½d. a day, or 7s. 6d. for the three months, and not, as

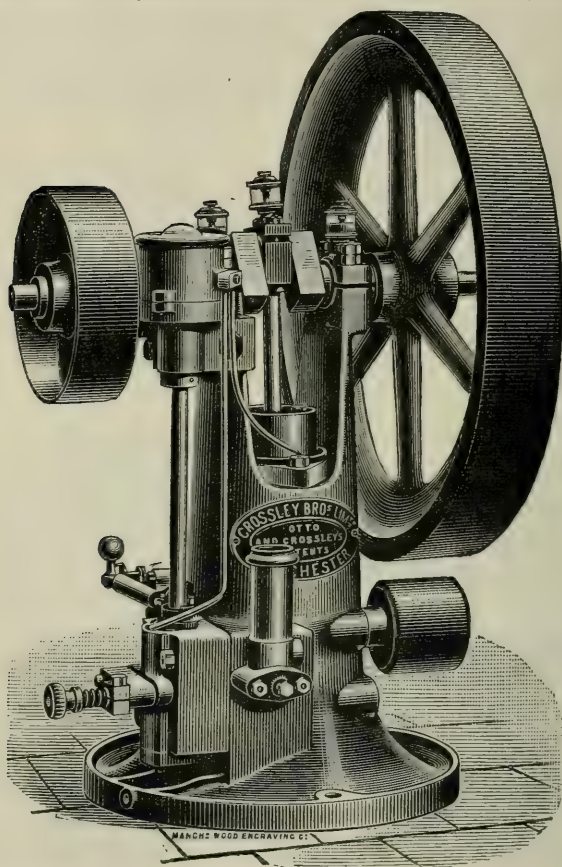


FIG. 1.

shown by a misprint in our last Extracts, as 1d. an hour, there being a consumption of four feet per hour, or five hours for 1d. by meter; while, of course, the consumption of the smaller one will be correspondingly less. Fig. 1 gives us a fair idea of this new candidate for our favour. I have looked into the comparative merits of steam, hot air, gas, and water, and the result is shown in

a paper sent to the International Medical Congress at Washington in September last; suffice it to say, that in economy nothing approaches the Otto. Of course, where electricity is laid down in the streets, and the price is reasonable, it is far preferable to use this force than any other, on account of the exemption from care and trouble that any mechanism necessitates if you wish for the best results, although, as far as simple economy is concerned, particularly if anything more than the smallest power is required, I think the Otto will best meet the requirements.

Pardon me for bestowing so much attention to the motor, but I deem it of great importance.

The rubber dam was introduced by the late Dr. Barnum, of New York, about the year 1869. It consists of a sheet of pure vulcanized rubber, ordinarily about as thick as a piece of visiting card-board, and is used in dentistry to keep the cavity free from moisture. We are taught in the text-books to cut a piece large enough to go across the face under the nose, each side being held by buckles or weights, the rubber being punched where it is considered necessary to enclose or isolate the teeth to be operated on, this being the universal practice in America; but in this country, where the appliance has not yet met with the full appreciation that its merits deserve, there is a great repugnance on the part of some patients to its use; indeed, so strong is the prejudice, that I have been induced to make some concessions. At first I used small narrow strips of rubber, say $\frac{1}{2}$ in. wide by 6 in. long. These answered fairly, but gave me some trouble by the saliva creeping over the edges. Gradually I have enlarged the pieces until within the last year or so, I generally use a piece half the size of the face below the nose—that is, when I am operating on either side of the mouth. I find this meets all the requirements from the operator's standpoint, while the patient has half the mouth to breathe through, and I do not have that complaint of a feeling of suffocating that before was so common.

About 1876 I introduced to the New York Odontological Society a template or guide for cutting the holes in the rubber in their proper position. It consisted of a piece of sheet metal (Fig. 2), having the position of the holes marked out. This was laid upon the dam, and the holes punched accordingly; it is a good plan, and I advise you, gentlemen, to make them for yourselves, though, of course, they are not absolutely necessary. You may

place the rubber on the face, and mark with an instrument where the tooth is you wish to operate on; then punch your hole, preferably with one of the S. S. W. Ainsworth punches.

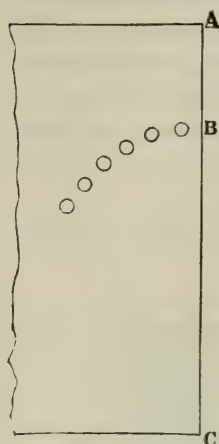


FIG. 2.

Then, remembering the shape of the arch, punch for the other teeth you expect to embrace within the dam. Three sizes of holes are amply sufficient—one for incisors, one for bicuspid, and one for molars—but as the two first are nearly the same, two will meet most requirements by measurement about one millimetre for the small and two millimetres for the large, or the middle and large hole of the Ainsworth punch. I hope you will fully appreciate the importance of these little matters; the distance between the holes at times requires close attention, and must be governed by the distances between the teeth to be included.

If you allow too little, the rubber may draw away from the tooth just when you require it to be water-tight; if you allow too much, it may be practically impossible to force it down with the floss silk. To give you some idea of the time that may be wasted in putting on the dam, in my early experience, soon after its introduction, I have spent many a half-hour, and sometimes an hour, before being successful. My difficulty arose from a desire to entirely prevent leakage by using too small holes. Dr. Brockway, of Brooklyn, in a paper on the subject, giving tables, &c., found that the average time it took him, with a trained assistant to ligate the rubber in position, was one and a-half minute. You will thus see it is largely a question of judgment. The number of teeth included in the rubber varies, two only are actually necessary; but it is generally desirable to place it over two or three more, so that it will not obstruct our view of the cavity. When dealing with bicuspid I generally, if the cavity is a mesial one, commence with the tooth in question, and carry the dam over each tooth to and including the lateral, the shape of this tooth lending itself readily for this purpose. If it is a molar to be filled, include the two bicuspid, &c.

Soon after the introduction of this valuable invention, difficulties were met with in holding the rubber in position. This led

to the use of clamps, of which we have a large number to show you. Their main object is to keep the dam close to the neck of the tooth. As you know, the neck is generally the most sensitive external part of the tooth, and the clamps often give much pain. I think I may say this pain is generally unnecessary. Personally I have no complaints from this quarter, partly because I do not allow the clamps to force themselves into the gum, but should this be absolutely essential, I then have resource to a 20 per cent. solution of cocaine, applied by a camel's hair brush to the gingival border. You may do without the clamp by the exercise of a little ingenuity; a bit of stick, as a tooth-pick, passed in between the teeth with the ends protruding will form points to loop the rubber over and securely hold it, or you may try Dr. Coffin's device, which I often use with satisfaction: put a bead or two on your silk ligature, one on each side; this will prevent the dam pulling off. As an improvement, I use a bit of brass tubing, cross-section; it is larger, and yet by not being thicker, does not raise the string away from the tooth.

Having placed the dam in position, and ligated the tooth to be operated on and the one next facing the cavity, we must now draw back the loose part out of our way. Ordinarily this is done by buckles, pins, &c., as in the Caggsell, the Fernald, &c.; but I get a better result by a modification of Dr. Perry's holder, as shown in Fig. 3. The rubber is stretched over the pins on the shield, and in that way is quite removed from obstructing the view.

To get the full benefit of the rubber dam, you must have some means of getting rid of the saliva, which at that time seems to accumulate to a disagreeable amount. In the old days, we used to have rubber bibs and aprons, or cover the patient with towels, &c.; but something better, in the shape of a saliva ejector, was introduced by Fisk, of Massachusetts, as long ago as 1867. This was good, but required considerable water pressure, and was expensive. From that time to the present we have had many forms introduced to the profession, but they are all on two principles, either that of the Giffard ejector, first used in France for steam-boiler feeding some twenty-five years ago, but in which a current of water was made to do the work of the steam. A

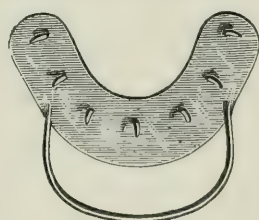


FIG. 3.

pencil or point of water, under pressure, was carried across an air space in the tube, carrying the air with it through a contraction in the pipe that prevented its return. In addition to this suction-action of the jet, we have in the one illustrated, which I designed some ten years ago (Fig. 4), the suction produced by the conical character of the tube itself—as it is a well-known

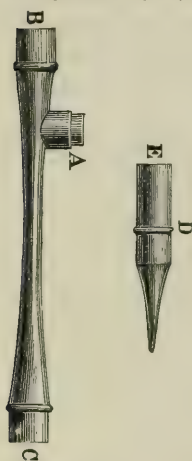


FIG. 4.

fact in hydraulics that a conical outlet will have nearly double the efficacy of a simple tube. Of course the small end of the cone must be against the current.

The other principle alluded to is that of the Sprengel air-pump, where globules of mercury drop through a glass tube, enclosing small quantities of air between each globule. Except that for dental purposes, water is used instead of mercury, as an air-pump, it is the best we have, being generally used, very much modified, in exhausting the air from incandescent lamps. With water its efficiency is less, depending almost entirely upon a considerable fall from the ejector. If you care to test the several patterns sold at the depôts, I think you will find them very feeble, hardly doing more than keeping up the action of a syphon. From my tests I have not been able to get them to draw plain water from a vessel placed six inches below the attachment of the rubber tube. Practically, they will frequently do all that you require—remove the saliva—being aided by gravity; but if the saliva is viscid, it will frequently fail to lift it. But this trouble disappears in a measure if you can use a greater fall. If you can pass the tube out of the window, and down some ten or twelve feet, all the power desired may possibly be had; nor is it necessary to have any standard or appliance, a piece of lead pipe, $\frac{1}{4}$ in. diameter, running directly from your water tank past the chair out and down, connecting your rubber tube at any point convenient to the chair. Nor is a water reservoir necessary; merely connect your small pipe to any of your service-pipes by means of a small tap, turning this tap just enough to give you the desired suction by permitting the water to pass out drop by drop.

Of the two systems, I much prefer the one first described; and those of you who have attended our clinics for years past may

remember my arrangements. I use high-pressure water from the street for the fountain that constantly plays in the spittoon. The water of this fountain passes through the ejector at all times, consequently it is always ready. I get power enough to collapse the rubber tube by the vacuum produced, and the force of the water is always more than sufficient to thoroughly remove any saliva, and this without any special water appliance whatever. Nor could I, being on the ground floor, go down to get a fall if it were desirable.

(To be continued.)

TWO CASES OF EPULIS.

By Mr. C. RIPPON, L.D.S.I.

DURING the past six months I have had in my own practice two distinct cases of epulis, one occurring in the inferior and one in the superior maxilla. First :—Miss W——, a domestic servant, about 24 years of age, applied to me respecting the difficulty she experienced in closing her mouth properly, and particularly in masticating her food. On examining her mouth, I found that all her back teeth, upper and lower, were decayed down to the level of the gum, so that when her mouth was closed the lower incisors were pressing upon the roof of the mouth and the gums touching each other behind. Between the second bicuspid and the first molar roots (lower left side) there was a small epulis about the size of a pea, just sufficiently large enough to prevent the jaws from shutting properly ; consequently during mastication, this growth frequently got squeezed and so caused her annoyance, though not very painful. In figure, the tumour was nearly round and attached by a narrow neck to the gum between the above-mentioned teeth. On the lingual aspect it very much resembled true gum, but of a bluish red colour, probably caused by the frequent squeezing between the jaws. I extracted both bicuspid and molar roots, and while removing the latter the growth and alveolus to which it was attached came away with it. I have since extracted the whole of the roots both upper and lower, and replaced them with artificial dentures, which she is now wearing with comfort, and there is no sign of a recurrence of the tumour.

Case 2.—Miss H——, age 22. In this case the patient had noticed the growth for the past ten or eleven years, and had attained a considerable size (about the size of a filbert nut) ; it was entirely free from pain, but disfigured the patient very much, as it was partially

exposed, the lip not being able to cover it. The tumour occupied the position between the right superior lateral and canine on the labial aspect, and in shape very much resembled fig. 81, page 161, "Salter's Dental Pathology and Surgery." The teeth were very irregular, at the same time very much decayed. The growth had all the appearances of healthy gum tissue made up into a lobular mass, and attached by a broad base extending from the mesial side of the lateral to the centre of the canine. I extracted both the lateral and canine, extirpated the growth and removed a considerable portion of the adjacent bone, the dividing wall of the socket being very friable. In a fortnight after the operation I took a cast of the mouth, which was apparently healing very rapidly. I have not seen the patient since, but have heard that she is perfectly well again and no signs of a recurrence. The operation proved very successful with cocaine, the patient only complaining of pain when the bone was being cut rather deeply.

AMERICAN DENTAL SOCIETY OF EUROPE.

ADDRESS BY THE PRESIDENT OF THE SECTION ON DENTAL
EDUCATION :

GEORGE CUNNINGHAM,

B.A. (Cantab), D.M.D. (Harv. Univ.), L.D.S.Eng.

Lecturer on Operative Dental Surgery at the National Dental College; Lecturer on Dental Surgery, approved by the Special Board of Medicine, University of Cambridge.

GENTLEMEN,—Before proceeding to discuss the special subject with which this section is charged, permit me to offer a few words of explanation as to the position I now occupy. I need scarcely say how much I value the compliment of being asked to preside over so important a section as that on dental education, a compliment which I did not accept without a great deal of hesitation and some considerable amount of pressure on the part of some of the pillars of this Society, and that mainly for two reasons. The first was, because of my temperament, which makes me rather incline to the rôle of a free lance in the field of discussion than to that of President, whose qualities should always be associated with calmness, impartiality and the weight of great experience. My second reason was perhaps the more important of the two, namely, the possibility of my being unable to be present at the

meeting. I am sure, however, that in the opinion of this Society my excuse is of the best : if possible I hope at or about the time of this meeting to be in Washington, taking part in the International Medical Congress.

In order to make the communications and the discussions on the subject of dental education as practical as possible, let me first of all direct your attention to the international aspect of the question. No doubt the old adage, "Circumstances alter cases," in which we are, perhaps, apt to seek refuge when a point is made against our cherished institutions or our pet theories and ideas, will come into play. Now, while we admit the great force of modifying circumstances affecting our different countries, it cannot be gainsaid that there is an ideal education common to the whole dental profession, irrespective of country, irrespective of existing or non-existing institutions, and irrespective of our personal predilections.

The aim and object of our proceedings, however, must be no vain effort in search of a fugitive ideal, but an earnest endeavour to embody our highest aspirations in a practical utilitarian form to show what in our opinion constitutes the minimum course of dental education which, in the best interests of the public, we should demand from our dental students.

As life itself is characterised by the three several stages of childhood, youth and manhood, so I think we can observe three corresponding periods in the educational development of the dental practitioner. We must consider, firstly, the standard of Preliminary Education, which we may rightly require of everyone pretending to enter a liberal profession such as ours ; secondly, that Professional Education, both medical and dental, which is necessary to qualification ; and thirdly, that most fruitful but too often greatly neglected course of all—the period of Post-graduate study.

These three stages of our subject could only be efficiently treated by a longer discussion than circumstances permit ; and as I have no doubt a practical unanimity will prevail amongst us as to the first and possibly as to the third stages here indicated, I shall ask you, as far as possible, to concentrate the discussion upon the second stage, which we will again subdivide for the purpose of facilitating debate.

With regard to the first division of the subject, it stands to reason that the dental profession, as such, will never occupy its

proper position so long as it fails to exact from its students the same amount of ordinary school education as is demanded of those entering other liberal professions.

Both in England and in Germany, I think, it will be admitted that the certificate of the preliminary examination in arts in the one country, and the certificate of efficiency for the *prima* in the other, is all that may be required, and has the additional advantage of being identical with that demanded of the medical student.

I trust I am only expressing the opinion of all present when I say that the dental profession will only be satisfied by the same standard of preliminary education being demanded of the dental student as is required of the medical student; in this respect, at least, we must be content to take no subsidiary place, and if in certain countries, notably America, no such evidence of preliminary education is demanded of the medical student, the dental profession of that country will only be honouring itself by insisting upon evidence of such an initial preparation from its students, and so setting a good example to their medical brethren. I can well remember being greatly struck by this initial but essential difference between the dental student in England and in America, so much so that when called upon to respond for England at a social gathering of the American Dental Association in Philadelphia, in the year 1876, I made that very subject the principal theme of my speech. In justice to the great common and free school institutions of that country, every dental and medical faculty should demand an examination in arts equivalent to those already mentioned. A preliminary examination in arts would do very much to enhance the appreciation of American diplomas abroad.

The provisions of the English law, so far as regards preliminary education, possess one great advantage over the similar provisions in Germany. Besides having one specially recognised examination, they publish a list of certificates or diplomas attainable in different parts of the world which are recognised as equivalents, and what is still more important, such a qualifying examination is always open to a man, no matter what his age or what his antecedents, thereby enabling him to make up for the possible deficiencies of his earlier education. Owing to lack of this early training in many otherwise well qualified men, it might be well if some temporary provision could be made for men of tried experience and mature years who are desirous of proceeding to a diploma. The

examination, which is fairly easy to a lad fresh from his school studies, becomes an almost insurmountable barrier to the man of some age, even if he has had a good scholastic training in his youth. The cramming up of such studies for examinational purposes must be of very equivocal value. In founding new regulations, some regard should be had for these individuals, not merely in justice to them, but to prevent the loss to the profession of many valuable recruits.

Secondly: the professional education of the dental practitioner may be considered under two heads, that which is general or medical and that which is special or dental.

The consideration of the first of these divisions is, I think, one on which this Society should express no undecided opinion. The main question resolves itself into this: shall it be identical with that of the medical practitioner, or shall it be limited to a part only of the full medical curriculum? To many this question may seem scarcely worth discussion, from the general consensus of dental opinion in favour of the latter view; and so far as England indeed is concerned, after a long and vigorous contest on the part of the opposition, the question may be considered to be finally settled. It cannot be denied, however, that a number of the most earnest workers in dental research, and many of the best dental practitioners on the Continent, strongly maintain the necessity of the dental surgeon being fully qualified medically. With all sympathy for this noble ideal, I have a very strong conviction that the firm adherence to the medical curriculum as a *sine quâ non* is a tremendous obstacle to the establishment and advancement of a reasonable and an efficient dental curriculum. This is notably so in the case of such countries as France, Austria and Hungary, where the barren discussion still goes on, while the special dental curriculum of England and of Germany is bearing a rich harvest.

The aphoristic statement that "the greatest good is that of the greatest number" should alone suffice to convince those who hold this lofty but narrow view on dental education. In these days, the urgent and almost universal demand for the services of the dental practitioner has called into existence an immense army of more or less unqualified men, especially where no special dental diploma has been instituted. In the interests of the public, it is our duty to agitate for such an institution, and, when obtained, to

maintain its honour and integrity with all our might. Considering the very exceptional and special nature of the necessary dental training for the efficient practice of what is, and must ever be, an important but yet minor branch of general surgery, it is manifestly absurd to contend that this specialty should only be practised by those who have expended about half as much again of the time and cost of study as is required of the major practitioner, in whose hands we are content to leave the very issues of life and death itself.

Though I have used the term minor as applied to our specialty, it must not be inferred that minor education or minor examination will satisfy our aspirations. The original memorial addressed to the Royal College of Surgeons of England, for the institution of the dental diploma in 1860, strikes the right note and is as true to-day as it ever was. "The memorialists do not suggest an education and examination inferior to that required of the medical practitioner, but propose a certain advantage in kind only, not an advantage in degree—an education and examination specially adapted to the requirements of the dental surgeon as distinguished from that for the general surgeon." The two greatest authorities who have ever written on dental education strongly support the contention we are now making. The first is the present distinguished President of the Harvard University, who, in an admirable address, estimated the general medical subjects at three-fifths and the special at two-fifths of the whole education, rightly required after the aspirant to a dental diploma. The other, and not less distinguished authority, is that of Sir John Tomes. A careful perusal of his address on "The Study of Dental Surgery, and the means thereto," delivered at the International Congress of 1881, should be sufficient to convince all those earnest supporters of the cause of dental education who still maintain the necessity of a full medical curriculum for the dental practitioner that in so doing they are wrong, and that by modifying their views in consonance with his, and by promulgating them, they will be rendering a service alike to themselves, to their profession and to their country.

If we decide, then, that the general or medical part of the curriculum required of the dental practitioner shall not be identical with that of the medical practitioner, we must carefully consider what subjects should be common to both curricula. So far as the

consideration of this part of the subject is concerned, we cannot do better than consider the minimum requirements of the General Medical Council, England :

TABLE OF MEDICAL SUBJECTS FOR THE DENTAL DIPLOMA.

Anatomy	- -	One Course of Six Months.*
„	- -	Dissections—Nine Months.
Physiology	- -	One Course of Lectures—Six Months.
Chemistry	- -	„ „ „
Practical Chemistry	„	„ Three Months.
Surgery	- - -	„ „ Six Months.
Medicine	- -	„ „ „
Materia Medica	„	„ Three Months.
Practical Surgery and Clinical Lectures	- - -	Two Winter sessions of Six Months each.

Anatomy, physiology and chemistry constitute the essential foundation of any medical education. Therefore, we fail to see why the general primary medical education and examination of the dental student should not be identical with that required of the medical student. It must be admitted that this further similarity as to the primary examination would do much to prove that the dental "curriculum" only differs by kind and not in degree from the medical, and consequently would do much to greatly improve the position of our profession. Under existing conditions in England, such a step ought to be readily effected, as the class-attendance already required so nearly coincides with that of the medical student. In anatomy, for instance, the dental as compared with the medical student is relieved of only a part of one course of lectures and of three months' dissection. Again, the dental student is excused attendance on the thirty meetings of the practical physiology class. No such exemption should be allowed, as the remarkable advances made in physiology require a longer period of study than that at present allotted in the dental curriculum. The attendance on the lectures on chemistry and the three months' practical course is identical for both the dental and the medical student in England; but unfortunately the former is not examined on the subject, the natural result being that he too frequently neglects to make a proper study of the subject.

* The Royal College of Surgeons of England require a second course of Lectures on Anatomy, or a course of 20 Lectures on Head and Neck.

Examination in chemistry should form an essential part of the curriculum, unless indeed it becomes, as in some of our university curricula, a part, with biology and physics, of the preliminary scientific or first M.B. examination. The studies and examinations at Harvard University, so far as regards anatomy, physiology and general chemistry, are absolutely identical with that required from the medical student. I cannot help thinking that physiology does not receive the attention it merits at the examination board in England.

Those who are interested in ascertaining the place which physiology should rightly acquire, whether as a discipline or as practical useful knowledge, ought to read the able and eloquent address of Professor Michael Foster, delivered in Cambridge in 1880 before the British Medical Association.

One course of six months' lectures on surgery, on medicine, and three months on materia medica, also an attendance at a recognised general hospital, with clinical instruction of not less than one year, seem very reasonable provision to demand from the dental student. The lectures on forensic medicine, midwifery, pathology, practical pharmacy and vaccination required in the medical curriculum are not demanded from dental students, but are replaced by special dental studies.

The only amendment which we could propose would be the exclusion of pathology from this list of exempted subjects. Thanks mainly to the teachings of Cohnheim and other pathologists of the German school, the study of general pathology is now regarded rather from the view of disturbances and derangements in function, and also of perverted nutrition, than from that of purely morbid anatomy and histology. It must be evident, therefore, that a complete and practical study of the elements of general pathology, with its allied and included subject of bacteriology, is essential to a due and proper comprehension of the special pathology of the parts with which the dental practitioner has to deal. A course on this subject would certainly be more useful than, and might advantageously replace, the three months' course on general materia medica.

We must now consider what Sir John Tomes rightly terms the all-important special subjects comprised in a dental curriculum. This part of the subject divides itself into two main branches, viz., mechanical and operative dentistry, the latter term being used in its very widest sense.

So far as mechanical dentistry is concerned, the requirements of the English diploma are: first a certificate of attendance during a term of three years in the laboratory of a reputable dental practitioner; and, secondly, the attendance on two courses of lectures, on mechanical dentistry and the one course on dental metallurgy. In order that these lectures should have their full weight and importance with the dental student, they should be attended during his term of pupilage, and not, as is so frequently the case in England, after this period, when he has laid aside the sculptor and the file, of which he is probably somewhat tired, for the excavator and the plugger, with which he is more enamoured.

As Sir John Tomes so wisely and beautifully expresses it, "It is one thing to know the scientific principles of an art, but it is quite another to carry them into effect. This requires an amount of skill of hand which can be attained only by long and careful practice under competent teachers. The fingers must become unconsciously obedient to the will; they must follow it automatically as the fingers of the skilled pianofortist execute the mental reading of the work he is playing, or as the hand of the sculptor produces the form the mind has conceived. Short of this unbidden obedience of hand, the performer would be but an amateur, and his professional life one long apology—a life of words in the stead of work."

From the possibility of such a certificate being more or less fraudulent, from the fact that the instructor may be incompetent or neglectful, but mainly from the cause that in many countries the profession is now a closed one, it becomes a serious question whether or not the teaching in this subject should not be conducted in a school under the open method, as is already the case in operative dentistry. Though we might not think it advisable to abolish the older system, which has much to recommend it, the establishment of an optional course in an open school might excite a tendency to greater efficiency on the part of private instructors.

The seven years' apprenticeship in the good old-fashioned English "workshop," with its advantages as a mechanical training, is gone for ever. It would seem easy, however, to resuscitate something, if not all, of the skilfulness of the dental mechanic of the past by allowing a part of the period of pupilage to be spent in a course of instruction in practical mechanics in some school of technology. By the adoption of some such plan, the student in

the laboratory would acquire a training not merely mechanical in name but in fact.

The consideration of that part of our subject which relates to operative dentistry need not detain us long. In the English schools, the lectures are confined to two courses on both dental-anatomy and physiology, and on dental surgery and pathology. With regard to dental anatomy, I can confidently say it would be difficult to find a better and more complete course than that which exists in either of the two London Dental Schools, embracing as it does a very thorough and complete study of comparative odontology, and following closely the lines laid down in Tomes' "Manual of Dental Anatomy." It is difficult to assume that the study of the student in this subject can be complete until some provision is made for his having a previously acquired knowledge of animal morphology, which already forms a part of an English university medical curriculum.

The syllabus, too, of the lectures on dental surgery and pathology is complete, thorough and exhaustive. The question, however, may well be raised, whether the dental profession should still be content with mere didactic teaching on those subjects. I think there can be no doubt that a very considerable, if not the major, part of the advance in medical science is greatly due to the enormously improved system of physiological teaching in which didactic teaching no longer suffices without a thorough and complete practical course of study in the shape of exercises in the physiological laboratory. If in this respect we can further identify the system of teaching those two fundamental departments of special knowledge with the practical system now adopted in the medical schools, we might safely expect to further raise the special dental-scientific knowledge of our profession and thereby promote our greater efficiency as practitioners of the healing art.

Attendance is not required on any special series of lectures on operative dental surgery by any of the British licensing bodies. While admitting that no mere attendance on such a course will suffice to make the dental student an efficient operator, I certainly think that a good course on this subject would do much to improve the dental student. In such a course it should be the aim to show the application of the many various methods and appliances now in use, to the various normal and abnormal conditions with which he has been familiarised by his training in the other courses of lectures.

At the National Dental College of London such a course has been instituted for nine years, and I think the success which has attended the teaching of the two able lecturers who have held the post, namely, Dr. Finley Thompson and Dr. St. George Elliott, should stimulate the larger London Dental School to found a similar course of lectures.

The treatment of irregularities of teeth forms so important and essential a part of the dental practitioner's practice, that we do not think it receives adequate attention when it forms the subject of only a few lectures in the course of dental surgery and pathology. The appointment of a specialist in this subject to deliver a full and complete series of lectures and demonstrations on this subject would do much to raise the attainments of the profession in the treatment of this difficult part of our specialty. It is with deep sense of the advantages which I derived from such extra courses of lectures at the Harvard Dental School, including also one on dental materia medica and therapeutics, that I am prompted to suggest their adoption in our English schools.

With regard to the attendance at a recognised dental hospital, the provision of a full two years' course, as required by the British licensing bodies, is adequate. The teaching of the demonstrators is efficient and thorough, and as an evidence of the remarkable advance which the London schools have made in this respect, I cannot do better than refer to the evidence of one of your own Presidents, Dr. St. George Elliott, who said that, as an examiner, he had seen as good work in operative dentistry by English dental students as by the students of any American school.

Thanks mainly to the exertions of the Dental Examiners at the Royal College of Surgeons of England, especially of Mr. Thomas Arnold Rogers, a practical examination forms an essential and important part of the ordeal necessary to obtain the English qualification. This part of the examination is conducted at one or other of the dental hospitals by the Dental Members of the Examining Board, who are in no way connected with the teaching department of the schools. A liberal supply of patients is provided, the student is required to explain fully the proper methods for the treatment of the mouths requiring operations, and is usually required to perform a more or less complicated gold filling. He must also give and discuss his opinion on the appropriate treatment of several cases of irregularity and other dental lesions. The examination mostly lasts about three

hours, and from a recent personal experience, I can vouch for the extreme fairness, completeness and thoroughness of that part of the examination. The Deans of the London Dental Schools have advocated the addition of a practical examination in mechanical dentistry, a suggestion which commands approval.

With regard to the other part of the examination at the Royal College of Surgeons, England, it is conducted by papers and *vivâ voce* questions on anatomy and physiology, surgery and pathology, dental anatomy and surgery, and dental mechanics. The only improvements that we could suggest in this examination would be its division into two parts—the first for the purely medical, the other for the dental subjects. In this way it would seem possible to make some provision for examination in some of the subjects taught but not examined upon, such as chemistry, medicine, and *materia medica*.

The only other certificates required by the British licensing bodies to which allusion has not been made is that, first, of being twenty-one years of age ; and, second, of having been engaged four years in professional studies, after passing the Preliminary Examination.

I think, from the information I have given with regard to the English diploma, you will be convinced that, while we may be of an opinion that it is capable of improvement and further development, it is the highest, most extensive and complete dental curriculum which exists. I think you will also admit that the four years required is none too much in which to do justice to such a curriculum, and indeed I know that a very large number of the students are unable to overtake it within that period of time.

In countries where a special dental diploma is a new institution, and the requirements pressing, it may be contended, with no little show of reason, that such a course is too long, too onerous and too expensive. It may be well, however, to remember that the English curriculum is the same as originally instituted in the year 1858, with the exception of the preliminary examination, which was wisely only made obligatory on students beginning their studies after the passing of the Dentists' Act of 1878. Of course, with the enormous advance in teaching, very considerable improvement has taken place in the development and practical results obtainable by such a standard of dental education. We cannot but think, therefore, that the nearer the various schools approximate the English standard the better it will be for the dental profession and the general public in all countries.

There is one excellent feature in the English scheme to which I must allude, and that is the formation and publication of a complete register of dental practitioners by the General Medical Council of Great Britain. A similar system of registration should form an essential part of the scheme wherever a dental diploma is instituted.

With regard to the third and final period of dental education, the period of post-graduate study has not, it seems to me, yet met with adequate recognition at the hands of those who have written, many of them so well and so ably, on dental education. The development of this part of the subject I must leave to a more fitting opportunity, and will merely indicate one or two points which merit attention.

The following out of the relatively small amount of extra study which would enable the dental practitioner to acquire a full medical and surgical diploma may be strongly recommended to those who are ambitious to take high places in the profession, and who have the time and the money to spare, as both will be profitably invested. It is also a question whether a further extension of special dental teaching might not be instituted for the benefit of those who would prefer to still further develop a scientific study of their specialty. Such courses, being instituted under the guidance of the best workers in the profession, might take the line of investigation and original research.

At Edinburgh University, a course of post-graduate study has been arranged for the benefit of medical practitioners, and in connection with it, I believe that the Edinburgh Dental School purposes instituting similar courses of study for dental practitioners already in practice.

Until the institution of some such course or courses as we have indicated, the young dental practitioner should early avail himself of the existing substitute by associating himself with dental as well as other scientific societies. He should not merely be content with the enjoyment of the social advantages to be derived from such institutions, but he should also make a serious study of the papers and discussions with a view of taking an early and intelligent part in the same. If in any way he can attach himself to a general or special hospital, whether in the capacity of dental surgeon or demonstrator, he will be doing much to promote his final and truly higher professional education.

From actual personal experience, I should also strongly recommend

the young dental practitioner not to be too eager to rush into practice for himself, and provided the opportunity occur, he will do well to associate himself as assistant to some dental practitioner of repute and good practice. Here he will find an opportunity of eradicating some of the minor shortcomings which seem incidental to hospital practice, and if not too bumptious and full of his own conceit, he will thereby secure an experience which is not to be measured by the amount of his emoluments.

One often hears a good deal against the Irish diploma granted *sine curriculo*. Let me call your attention to one good and excellent provision which the Irish College of Surgeons exacts from its graduates: "I shall not attract business by advertising or any other unbecoming practice, and I agree that such diploma shall be cancelled on its being proved that I have done so."* Like many another evil thing, the advertising quack will be ever with us, but a united and well-directed effort should be made to restrain the graduates of all reputable dental schools from debasing their diploma, their school and their profession, by advertising and other disreputable and unprofessional means of attracting practice.

In conclusion, gentlemen, I apologise to you for the lengthy nature of this address, and I can only plead in extenuation the nature of the subject, which will no doubt meet with the exhaustive discussion its great importance merits.

LODGMET. OF A TOOTH-PLATE IN THE GULLET FOR FIFTEEN MONTHS.

By HENRY E. BRIDGMAN, L.R.C.P.Lond.

AT 2 a.m. on April 17th, 1886, Thomas H—, aged twenty-eight, was brought to my surgery. He informed me that he had gone to bed, as was his habit, wearing a small plate, to which were attached four false teeth. He awoke feeling the plate slipping in his throat, and he could, he said, still feel it at the top of his gullet. The patient was nervous and excited; he frequently retched, and expectorated blood-stained saliva; dyspnoea and dysphagia were marked. I examined the pharynx carefully with the finger, but

* Something similar to this is agreed to by the Licentiates in Dental Surgery for the Edinburgh College and of the Faculty of Glasgow, but not by the College of Surgeons of England.

failed to feel any foreign body. With a pair of throat forceps I seized something that I believed to be the plate, but on making an attempt to withdraw it, the dyspnœa increased, the patient, struggled, and the forceps slipped. After several fruitless attempts to seize the plate a second time, I desisted, and sent my patient to the Burton-on-Trent Infirmary. There probangs were passed into the stomach without meeting with any obstruction. The patient was watched for a few days, and then discharged, the dyspnœa and dysphagia having disappeared.

I saw the man a few weeks afterwards, when he was again suffering from dyspnœa, had a hard, frequent cough, and was expectorating copiously a tenacious mucus, tinged with blood. I continued to see him from time to time until Christmas, 1886. On July 25th, 1887, he presented himself again at my surgery, bringing with him the plate with false teeth attached, saying that he had continued much in the same condition as when I had last seen him, being frequently unable to go to his work on account of cough and difficulty of breathing, until July 21st, when, being rather worse than usual, he felt, after a violent fit of retching, something in the back of his throat, when, by means of his thumb-nail, he hooked out the false teeth, which he brought with him and which he had lost just fifteen months since.—*The Lancet*.

BRIGHTON DENTAL SOCIETY.

At the first annual meeting of the Brighton Dental Society, held last month, the Secretary (Douglas E. Caush), reported that they commenced their work, in November last, with eight members, and during the session the names of seven gentlemen were added to the list.

The meetings have been well attended, and much pleasure and profit have been derived from them, under the chairmanship of the President, Mr. O. A. Fox. The meetings have been six in number, and the following gentlemen read papers:—Mr. O. A. Fox, "Progression of Dental Surgery;" Mr. C. B. Stoner, "Dental Hospitals and what busy men may do there;" Mr. J. Wood, "On Regulation Bases;" Mr. S. Johnson, "Dental Materia Medica;" Mr. E. L. Norris, "Saliva and Salivary Calculus."

During the session the following objects have been brought before the Society:—Regulation bases, continuous gum work, forceps, nerve extractors, fillings on the Herbst principle, fillings

(gold and tin), abnormal teeth, and models of various cases of interest.

The following gentlemen were then elected for session 1887-8 : President, J. Wood, Esq. ; Vice-President, O. A. Fox, Esq. ; Curator, C. B. Stoner, Esq. ; Treasurer, S. Johnson, Esq. ; Secretary, Douglas E. Caush, 63, Grand Parade, Brighton.

INTERNATIONAL MEDICAL CONGRESS.

Held at Washington, D. C., on September 5, 6, 7, 8, 9 and 10.

SECTION ON DENTAL AND ORAL SURGERY.

JONATHAN TAFT, M.D., of Cincinnati, O., President.

Secretaries—A. M. DUDLEY, M.D., of Salem, Mass. ; F. H. REHWINKEL, M.D., of Chillicothe, O.

[We are greatly indebted to the liberality of the *Medical Record* of New York in supplying us with advanced slips of its special report —ED. D.R.]

MONDAY, SEPTEMBER 5TH—FIRST DAY—AFTERNOON SESSION.

The PRESIDENT welcomed those present.

Drs. I. V. METNITZ, of Austria ; B. McLEOD, of Scotland ; and GREVERTS, of Holland, replied in behalf of the countries they represent.

The PRESIDENT then delivered his address, in which he reviewed the progress of dentistry in the last fifty years, and concluded by saying that although the past record was an excellent one, yet the goal is not yet reached. He urged the profession, through those present, to work in all earnest for a yet higher standard.

Dr. R. J. PORRE, of Cincinnati, O., read a paper on

CHRONIC PYÆMIA FROM DENTAL ORIGIN.

The history of the case is as follows :—The patient, male, good constitution and habits, suffered for the last thirty years from neuralgia, besides having constantly recurring furuncles and eruptions in various parts of the body, which would often for months become running abscesses. He experienced burning and itching eruptions of hands and feet, which would finally change to stubborn ulcerations. His bowels were either stubbornly constipated or exhaustingly loose. He suffered from frequent rigours and febrile attacks of varying intensity, profuse night-sweats, retention of urine, serious constrictions of the bowels and urethra. Lancinating pains darted from the maxilla of right side to bowels,

bladder, limbs, hands and feet, or to whatever part that was locally affected at the time. This latter peculiarity, together with the discovery of a little pus exuding from the locality of the wisdom-tooth, led to a final correct diagnosis of his case.

The tooth referred to was extracted, and a speedy and complete recovery followed. As other sources leading to pyæmia and having their starting-point in the oral cavity may be mentioned pyorrhœa alveolaris, alveolar abscess, abscess of the antrum, and dental caries.

The doctor related ten other cases similar to the above, which all yielded to the simple remedy of removing the offending tooth.

Dr. J. FRANK LYDSTON, of Chicago, Illinois, said that both physicians and dentists should appreciate the important relation which morbid conditions of the mouth and jaws, especially those which may be produced by septic absorption, bear to different general conditions. Septic matter is quite generally found about the roots of teeth, and may, under favouring circumstances, be absorbed into the blood, and there produce disturbances of greater or less degree.

The paper was further discussed by Drs. Walker, of London, England; Barrett, of Buffalo, N.Y.; W. J. Younger, of San Francisco, Cal., and Chance, of Oregon.

TUESDAY, SEPTEMBER 6TH—SECOND DAY—MORNING SESSION.

Dr. WILLIAM CARR, New York, N.Y., gave a *clinic* on the
TREATMENT OF FRACTURES OF THE MAXILLÆ WITH MODIFIED
INTERDENTAL SPLINT.

The majority of fractures of the inferior maxilla occur in the body rarely at the symphysis menti, but usually directly anterior or posterior to the mental foramen. A noticeable fact in connection with these fractures is that the victim rarely applies for treatment for several days succeeding the injury. He realizes that some of his teeth are loosened and also that he is painfully bruised, but does not seek surgical aid until he becomes alarmed by the increased inflammatory condition of the parts. There is but little difficulty in establishing a correct diagnosis, as usually the following symptoms are present—great pain in the effort to open and close the mouth, swelling, crepites, inflammation, inability to masticate, and marked irregularity of the teeth.

Treatment.—It is identical with that of other fractures, namely,

to bring the parts into apposition and retain them firmly until ossification is completed. For treatment of fractures of the maxillæ there is nothing superior to the interdental splint. When properly adjusted, speedy union may be secured without deformity of the jaw or irregularity of the teeth. Before taking the impression a careful examination of the parts should be made. Loose teeth and spicula of bone should be removed, and the parts should then be brought as nearly as possible to their normal position. An accurate impression should be made with impression-compound or wax. The material used should be as warm as the patient can bear it, in order to prevent unnecessary pain and also to prevent further displacement of the parts. The splint is made of vulcanite and covers all the teeth of the lower jaw, and all the teeth posterior to the canine in the upper jaw—leaving a space of about three or four lines through which the patient may receive nourishment. Small holes are drilled in the splint over the grinding surface of each molar for the purpose of ascertaining whether its adjustment is proper.

The splint should first be adjusted to the sound jaw, then gently bring the fractured jaw into position until it has passed about two-thirds of the length of the teeth—then with a quick, firm motion bring the parts into position. Next apply a four-tail bandage, which should be retained from three to five days; after this time, in the majority of cases, it may with safety be removed during the day but should be replaced at night until the removal of the splint. The patient should be furnished with an ordinary rubber syringe, and instructed to keep the mouth thoroughly cleansed. For disinfectants I use peroxide of hydrogen three per cent. solution, or a solution of bisulphate of soda in the proportion of 3 j to 3 j of water.

In ordinary cases the splint should be retained for three or four weeks, according to the physical condition of the patient—unless unforeseen complications should arise. The application of the splint, combined with thorough cleanliness, will usually be all the treatment required.

The advantages, besides those previously stated, are that the patient experiences but little pain and inconvenience, and can, as a rule, attend to his business almost immediately after the splint is applied.

It is not necessary that all the teeth, nor, indeed, that any

should be present in the mouth in order to make this splint serve its purpose. In the first case the rubber can be made to take the place of the missing teeth, and in the latter case a perfect adaptation of the splint to the alveolar ridges can be secured, and will be found to keep the parts in perfect apposition.

Should it be deemed advisable to place a splint in position within an hour or two after seeing the case, one can be constructed entirely of ordinary gutta-percha, with just enough wire inside to stiffen it. Dr Carr demonstrated this last method—it is very simple and can be made by any surgeon.

A number of gentlemen examined the principle and pronounced it very satisfactory in every way, the main points being its simplicity of construction, its effectiveness, and the ease with which it is adjusted and worn by the patient.

Dr. E. BRASSEUR, of Paris, France, read a paper on

THE USE OF AIR IN DENTAL THERAPEUTICS.

The reader urged that the ordinary means, such as bichloride and biniodide of mercury and carbolic-acid crystals, for destroying microbes in the oral cavity, and, especially in carious cavities of teeth, should be supplemented by the use of hot air.

Dr. C. A. BRACKETT, of Newport, R.I., discussed the paper at some length, laying considerable stress on the efficacy of crystallized carbolic acid as a germicide in carious cavities in teeth.

Other discussions followed, by Drs. James Trueman and W. H. Morgan.

AFTERNOON SESSION.

Dr. JUNIUS E. CRAVENS, of Indianapolis, Ind. read a paper on

THE MANAGEMENT OF PULPLESS TEETH.

This system is based on the proposition that a pulpless tooth is not necessarily dead. The pulp being devitalized, the tooth still retains life through its pericementum. The usual course of treating pulpless teeth with escharotics and irritants cause irritation and final destruction of the pericementum, and the result is that the tooth, instead of being preserved, will act as a foreign body, and will be thrown off by nature through abscesses; or, worse still, will lead to no end of nervous derangements.

The treatment suggested by the reader is to thoroughly cleanse the pulp-canal, and at once hermetically seal it with tin-foil.

The paper was discussed by Dr. THOMAS FILLEBROWN, of Portland, Maine. He did not agree with the essayist in the method outlined in the paper. The doctor gave a short synopsis of the method he employs in treating pulpless teeth, which, by the manner in which it was received by the Section, seemed to be the one generally pursued.

Dr. A. W. HARLAN, of Chicago, Illinois, followed, and likewise objected to the views expressed by the essayist. A dead pulp produces no irritation in the canal; the disease which it causes is beyond. If you could mechanically displace an odour—which the speaker denied—and should then fill the root-canal without any disinfection, disaster would inevitably follow unless there should be a fistulous outlet.

Dr. W. C. BARRETT, of Buffalo, N.Y., in discussing the paper, stated whether viewed from the standpoint of pathology or etymology the paper is alike remarkable. That such a mass of absurdities could be presented at a meeting of the world's representatives in dentistry is to me astounding, and I protest against its acceptance as the standard by which to judge the intelligence of American dentists. Why the exploded dogmas of twenty-five years since should be gravely and in all sincerity presented at such a meeting as this is, I must confess, something for which I was not prepared. The assertion that a closed chamber in which exists a septic *débris* and the products of decomposition of the tooth-pulp should not be opened and evacuated, I can scarcely believe is made in calm earnest. The essayist has exhibited his complete ignorance of the progress of the past century.

Modern antiseptic pathology has taught us certain facts, and among these is the knowledge that the first step in the treatment of aseptic cavities is complete drainage; second, disinfection and removal of all the products of disorganization; third, destruction of septic organisms; and finally, the complete sealing of the cavity against further infection. These comprise the essential steps in the treatment of septic root-canals. I will not insult the intelligence of those present by presuming to enlarge upon this and by going into the details of treatment, for this is not a body of tirois. But I do object to a consideration of the subject from the low standpoint of this extraordinary paper.

Dr. T. E. WEEKS, of Minneapolis, Minn., read a paper on

MATRICES AS ADJUNCTS IN FILLING TEETH.

The essayist reviewed the different appliances for simplifying what would otherwise be very laborious operations. A perfect matrix should be simple in construction, cheap, easily adapted, and not too stiff, so that when applied it will yield just enough to allow sufficient gold to pass beyond the walls of the cavity for a good finish.

Dr. F. H. GUILDFORD, of Philadelphia, Pa., in a few brief remarks, indorsed the sentiment expressed in the paper.

THIRD DAY, WEDNESDAY, SEPTEMBER 7TH—MORNING SESSION.

Dr. PRADERE, of Lyons, France, read a paper on

PHTHISIS CURED BY THE CONTINUOUS APPLICATION OF MEDICINE
TO THE PALATE.

Immediately after the paper was read, Dr. JAMES TRUEMAN, of Philadelphia, Pa., moved that it should *not be accepted by the Section*, but should be referred, without discussion, to Section I., in General Medicine; also embodying that the Executive Committee be censured for allowing such a paper to come before the Section. The motion was seconded by Frank Abbott, M.D., of New York, but the Chair ruled that, inasmuch as the Executive Committee had seen fit to admit this paper, it would be out of order to put the motion to the house. Dr. Trueman dissented from the decision of the Chair, and renewed his motion. The question being then called, it was voted to refer the paper to Section I.

CLINIC.

A number of gentlemen gave clinics in the treatment of diseased conditions of the oral cavities, and others demonstrated their methods of filling teeth and constructing artificial dentures for patients. These clinics are spoken of as the most successful features in this Section, and it is but just to say that a good deal of credit is due to Dr. C. F. W. Boedecker, of New York, for the result.

Dr. METNITZ, of Vienna, Austria, read a paper on

OSTEOMYELITIS.

The main feature of the paper was the report of two cases from practice.

The history of the first case was as follows: In October, 1886, a lady, aged forty-three, had two teeth extracted. A few days later she suffered with chills, which were followed by slight mental disturbances. The seventh day the patient became unconscious, in which condition she was brought to the hospital. Examination revealed that there was a large swelling over the left cheek, extending to the temporal region; the skin covering this swelling was tense and pale in colour; the sclerotic was highly coloured (yellow), and the skin showed yellow tinge; the pupils were without reaction. The odour of the breath gave evidence of necrosis. The submaxillary glands were very much enlarged, and the neighbouring tissues infiltrated. There was unconscious urination and defecation. Death occurred the following day. The post-mortem examination showed the membranes of the brain to be thickened and traversed by numerous vessels. The left hemisphere was covered by a layer of pus, and the right hemisphere showed considerable pus along the track of the vessels as well as several pus-depots. The brain-substance was quite soft. The examination of the oral cavity disclosed that of the two teeth extracted the upper alveolus had almost entirely filled up with healthy granulations, whereas the lower was filled with pus. The mucous membrane in the region of this diseased alveolus was very much discoloured and could be easily removed in pieces. The probe discovered nothing but dead bone. All the muscles of the neck which are attached to the left side of the lower jaw were infiltrated with pus. The periosteum was separated from the left side of body and ramus of the jaw. The alveolus of the extracted wisdom-tooth communicated by two good-sized openings with the marrow-cavity, and the marrow itself was discoloured and infiltrated with fat. The cause of this extensive destructive action is no doubt to be looked for in the unclean condition of the alveolus after the extraction. Sections of the jaw show that the medullary canal was very much enlarged.

Kocher, Rosenbach, and Busch, in experimenting on animals, have found that it is impossible to produce an acute pus-forming osteomyelitis either through traumatic injury or chemical and mechanical irritation, but that such a condition can readily be brought about by infecting the fresh wound in the bone by any decaying substance.

The second case was one of multiple osteomyelitis. The

patient, male, aged seventeen, suffered from an attack of osteomyelitis of the humerus, the ulna, and the lower jaw. According to Billroth, it is not settled whether this condition (multiple osteomyelitis) is due to septic influences acting on various places at the same time, or whether the infection dates from one point.

Death in this case, as in the first, was directly due to acute suppurative meningitis. When we have to deal with a simple inflammation, energetic antiseptic treatment will prove quite sufficient. In severer cases of osteomyelitis Billroth advises that the seat of disease be reached as soon as possible—the pus evacuated, the cavity thoroughly disinfected, and dressed with antiseptic dressing. Many cases present no actual dépôts of pus, or abscesses, but simply an infiltration of the marrow. In such cases Billroth holds it of little value to open into the medullary canal. Neither does he advocate disarticulation or resection, because, in the first place, the exact extent of the disease cannot be foretold, and, secondly, the medullary substance of a patient suffering from osteomyelitis is in such a susceptible condition that a new injury would almost certainly prove fatal.

This paper was read by the essayist in German. No discussion followed.

Dr. JENISON, of Minneapolis, Minn., read a paper on

ART IN DENTISTRY.

The essayist advocated the restoration in gold of all teeth that had been destroyed by caries, thereby improving both their usefulness and beauty

In constructing artificial dentures more time should be given to the restoration of the features of the patient, and for that purpose single and not section teeth should be used.

Dr. JOHN ALLEN, of New York, discussed the paper, taking up the main points to be observed in constructing an artificial denture. He closed his remarks by saying that, inasmuch as the countenance reveals the thoughts of a person, great care should be exercised in restoring lost features.

THIRD DAY—AFTERNOON SESSION.

Dr. R. R. ANDREWS, of Cambridge, Mass., read a paper on
THE ORIGIN OF THE DENTAL FIBRIL, ILLUSTRATED BY AID OF
STEREOPTICON.

Dr. Andrews described his process of preparing and mounting

the specimens for the microscope, which differed in no essential respect from the latest methods employed by others for that purpose.

In speaking of the formation of the fibrils, the essayist says there are two kinds of odontoblasts—those which are square towards the dentine, and others, just by the sides of the first mentioned, which are pear-shaped. From these latter, and not from the first (or square end ones), originate the dental fibril.

The stereopticon views presented by the doctor showed very clearly with what patience, earnestness, and intelligence the essayist worked to establish his view of the question, and the hearty appreciation accorded him by the Section was well merited.

Dr. FRANK ABBOTT, of New York, in opening the discussion, paid a high tribute to the reader of the paper for the hard work done in behalf of his specialty. In order to understand the process by which the dental fibril is produced, it is necessary for us to consider the matter from the third to the fifth month of intra-uterine life, at which period of the existence of the foetus the papilla of teeth are so far developed that a material change is observed to be taking place. The papilla is a mass of myxomatous tissue, liberally supplied with medullary elements. In some instances at three months, at others as late as the fifth of intra-uterine life, a coalescing of several of the medullary corpuscles into one may be observed upon the periphery of the papilla adjacent to the enamel organ, which at this period may be observed forming a cap upon the papilla. The united medullary corpuscles are known as odontoblasts. The impression has generally prevailed among histologists and embryologists, that the odontoblasts were directly formed into dentine. This theory, through recent researches, has been proven to be incorrect. The odontoblasts, when viewed with a power of 1,200, show a delicate reticulum, which unites the nuclei with the walls of each corpuscle and with each other. This reticulum, as well as the walls of the odontoblasts, are the living matter which remains as the living portion of the dentine. Before the beginning of the deposition of lime salts, the odontoblasts are reconverted into medullary substance. As such they receive the calcareous basis-substance, and thus a certain territory of the papilla becomes dentine. While this process of calcification is going on, another row of odontoblasts makes its appearance, from the sides and ends, of which prolonga-

tions of the living matter may be seen running into the canaliculi of the dentine already formed. A spindle, or pear-shaped odontoblast, gives off one, while those with broad ends give off two, three, and even five prolongations. If the views advanced in the paper were correct, it would necessarily follow that territories of considerable size would be left in the dentine with no canaliculi whatever; nor is there any provision for furnishing these territories with any living tissue.

Dr. FLETCHER, of Cincinnati, O., read a paper on

PROTECTIVE DENTINE: ILLUSTRATED BY STEREOPTICON.

This paper was listened to with great interest by the Section. The slides which were shown on the screen showed the different kinds of protective dentine, and the essayist gave his views how these different efforts on the part of nature to protect herself are brought about.

Dr. W. X. SUTTUTH, of Philadelphia, agreed with the essayist in the practical conclusions drawn; he supplemented the reader's remarks by stating that the odontoblasts remain after the development of the dentine, but can be stimulated to produce or perform their function of forming protective dentine.

Dr. W. H. ATKINSON, of New York, complimented the gentlemen on producing such well digested papers.

Dr. J. HOWARD MUMMERY, of London, England, exhibited

PHOTO-MICROGRAPHS OF ALL THE STRUCTURES OF THE TOOTH, and explained the best method of producing them.

THURSDAY, SEPTEMBER 8TH—FOURTH DAY—MORNING SESSION.

MICROSCOPY.

Professor Frank Abbott, of New York, and Dr. R. R. Andrews, of Cambridge, Mass., were in charge of this department. Every facility was afforded the members of this Section to acquaint themselves with dental microscopy, both physiological and pathological. Among the ground specimens shown by Professor Abbott were those of carious teeth, congenital pathological enamel, hyperostosis (osteomas) of the roots of teeth, and deposits of secondary dentine. Dr. Andrews exhibited serial slides of the developing teeth, and the development of the dental fibril. About

forty negatives from his photomicrograph were especially interesting and valuable.

CLINICS.

About thirty gentlemen gave clinics in filling teeth with gold, pivoting teeth, constructing artificial dentures, and treating (surgically) diseased conditions of the gums. It would require too much space to enumerate all the gentlemen who acquitted themselves in such a creditable manner.

C. L. GODDARD, A.M., D.D.S., of San Francisco, California, read a paper entitled

PAIN IN THE TEMPORO-MAXILLARY JOINT CAUSED BY IRREGULARITY OF THE TEETH.

Patient, thirty years old, experienced pain in temporo-maxillary joint during mastication, which was caused by straining the muscles and ligaments, owing to masticating with the jaw protruded. When the teeth were brought together, as in the act of eating, the incisors alone touched, and the bicuspid and molars were about one-eighth of an inch apart. The treatment employed consisted in spreading the upper teeth and thereby securing a proper articulation.

Dr. E. S. CHISHOLM, of Tuscaloosa, Ala., read a paper entitled

THE INFLUENCE OF WEATHER CHANGES ON THE HUMAN ORGANISM.

After carefully noting the influence exerted by temperature, humidity, and electricity, the author concludes that by far the greatest power over human organism is exerted by atmospheric pressure. In support of this theory he submits two arguments. The normal atmospheric weight on a man is 14.7 pounds to the square inch at the sea level. The body is sustained by an equal power of resistance, wisely provided. If the pressure be less, the surface of the body will be distended, and the superficial circulation less restrained. This change can be brought about by exposure to great altitude, as well as by natural physical causes, when the circulation will be disturbed just the same. Any undue pressure on a portion of the body may then be felt. May not this disturbance of tension or soft tissues which are fixed to the bony framework of man, or where disease has a seat in periosteal and ligamentous attachments, be liable to greater inflammation? Or when a nerve of a tooth, which in a state of health is enclosed in

a bony chamber (which has no expansive liberties, nor needs them as long as health continues), becomes exposed through a small aperture ; when the normal atmospheric balance is lowered, the nerve has a tendency to be drawn through the aperture and takes on inflammation, probably followed by congestion and complete devitalization.

A report from the Pennsylvania Hospital, some years ago, on the observation of barometric pressure in surgical operations, shows that in 259 operations the barometer was ascending in 102, descending in 123, and standing in 34. Fifty-four of the whole number were fatal, 11 having been operated on with barometer ascending, 25 when descending, and 8 when standing.

AFTERNOON SESSION.

The Section was honoured by a visit from the President of the Congress, Dr. N. S. DAVIS. In introducing him, President J. Taft recounted the efforts that had been put forth by Dr. Davis to secure recognition to the Dental Section. To him more than to any other man in the medical profession is due the credit for having removed the obstructions in the way of the dental specialty.

Dr. DAVIS replied: Twenty-two years ago I had the pleasure of entertaining the members of the American Dental Association, then assembled at Chicago, at my house. On that occasion I expressed the hope that some day, in the near future, we might meet on equal grounds. My hopes of that day are realised to-day. At the last meeting of the American Medical Association, when the question was brought up to admit dentists holding their degree from a recognised institution, it met with no opposition. The action of that body has for ever removed the obstacle which had been in your way, and you are now on an equal footing with your medical brethren. He congratulated the members for the interest they took in the advancement of the healing art, and closed by warning them not to fall into "schools," but to meet everyone on the broad field of science.

Dr. E. S. TALBOT, of Chicago, Ill., read a paper on

ETIOLOGY OF IRREGULARITIES OF THE JAWS AND TEETH.

This paper was very exhaustive and thoroughly well prepared. The writer showed throughout an intimate acquaintance with the

subject, and the Section was not lacking in appreciation of his efforts.

The paper was discussed by Dr. W. C. Barrett, of Buffalo, N.Y.

A paper by Dr. J. J. R. Patrick, Belleville, Ill., on "Irregularities," was read by title; also one by Dr. E. H. Angle, Minneapolis, Minn., entitled "Notes on Othodontia, with a New System of Regulation and Retention;" also by Dr. L. C. Ingersoll, Koeku, Ia., on "Inflammation of the Oral Tissues."

FRIDAY, SEPTEMBER 9TH—FIFTH DAY—MORNING SESSION.

CLINICS.

A very interesting clinic was given by Dr. A. R. STARR, of New York, in capping the exposed pulp of a tooth.

It is only of late years that any progress has been made in so treating and protecting an exposed tooth pulp so as to preserve its vitality. The operation caused the patient very little pain, and all those who have had the opportunity to see it agreed that it was a success.

Dr. WILLIAM J. YOUNGER, of San Francisco, implanted a tooth. Great diversity of opinion was expressed as to the ultimate result of this method of thus supplying the lost teeth.

Dr. R. B. ADAIR, of Gainesville, Ga., completed the treatment of a case of pyorrhœa alveolaris.

Thirty-two other gentlemen gave clinics on filling teeth and constructing artificial dentures.

Prof. F. BUSCH, of Berlin, Germany, read a paper on

THE COMPARATIVE PATHOLOGY OF THE TEETH, WITH SPECIAL REFERENCE TO THE TUSK OF THE ELEPHANT.

A number of specimens were shown by the doctor to illustrate his paper. At the close of his paper the doctor exhibited an instrument for removing the small birth-marks so often found on the face. The instruments have a circular cutting edge ranging in size from one-fourth to half-an-inch in diameter, and fit into the dental engine. The mode of operation consists in selecting a knife the size of the mark to be removed, and placing it upon it, quickly revolving it. It will take only a moment to accomplish this, and is said to be almost painless. The only dressing the doctor applies is dry cotton, which he leaves in position for from

six to eight days, at the end of which time the part is perfectly healed.

Discussion of the paper was taken part in by Drs. Wm. H. Atkinson, of New York, and W. C. Barrett, of Buffalo, N.Y.

Dr. E. ANDRIEU, Paris, France, read a paper on

THE SIXTH YEAR MOLAR.

The essayist held that the sixth year molar being in development, eruption, and structure an organ of transmission from the temporary to the permanent set, it should be extracted when the permanent teeth are in position. More room is gained by this procedure, and a longer period of usefulness insured to those remaining.

Dr. L. D. SHEPERD, of Boston, Mass., expressed his regret that such sentiments should still be prevailing among the profession. He cited cases from practice, when the extraction of these teeth caused not alone loss of valuable masticating surface, but actual irregularity of the ones remaining.

Dr. PAUL DUBOIS, of Paris, France, stated that he wished the Section to note that the ideas expressed in the paper were not carried out by the dentists in France.

Professor FRANK ABBOTT, of New York, could see no difference in structure between the sixth year molar and the other permanent teeth under the microscope, but a very marked difference was apparent between that and the temporary teeth.

A paper by Dr. Th. David, of Paris, France, on "Aphthous Stomatitis," was read by title.

Dr. J. S. MARSHALL, of Chicago, Ill., read a paper on

OPERATION FOR THE CURE OF A PERSISTENT NEURALGIA OF BOTH
TEMPORO-MAXILLARY ARTICULATIONS AND REFLECTED PAIN IN
THE RIGHT BRACHIAL PLEXUS.

History.—Patient, female, forty-two years of age, was operated on some eight years before for the removal of an osteo-sarcoma of the right inferior maxilla. Extensive suppuration followed, and the wound did not heal for several months. Considerable cicatricial tissue was formed, and the jaw displaced to a considerable extent. Neuralgia dated from the healing of the wound, and the conclusion arrived at was that the irregular position of the jaw was the cause. An operation for the relief of this condition was performed, and the neuralgia ceased. The doctor described the steps of the

operation at great length, but failed to show that it differed from methods generally employed.

The following papers were read by title: "Articulation of Artificial Teeth," by Dr. H. L. Cruttenden, of Northfield, Minn.; "Power in Dentistry," by W. St. George Elliott, M.D., of London, England; "Porcelain Filling," by Dr. E. C. Moore, of Detroit, Mich.

(To be concluded.)

EXTRACTS FROM RECENT ADDRESSES.

Now the belief in a special vital force has disappeared like the *ignis fatuus*, and no longer lures us in the wrong direction. We know now that the same laws regulate the formation of chemical compounds in both animate and inanimate nature, and the chemist only asks for a knowledge of the constitution of any definite chemical compound found in the organic world in order to be able to promise to prepare it artificially. . . .

But now the question may well be put, is any limit set to this synthetic power of the chemist? Although the danger of dogmatizing as to the progress of science has already been shown in too many instances, yet one cannot help feeling that the barrier which exists between the organized and unorganized worlds is one which the chemist at present sees no chance of breaking down.

It is true that there are those who profess to foresee that the day will arrive when the chemist, by a succession of constructive efforts, may pass beyond albumen, and gather the elements of lifeless matter into a living structure. Whatever may be said regarding this from other standpoints, the chemist can only say that at present no such problem lies within his province. Proto-plasm, with which the simplest manifestations of life are associated, is not a compound, but a structure built up of compounds. The chemist may successfully synthesize any of its component molecules, but he has no more reason to look forward to the synthetic production of the structure than to imagine that the synthesis of gallic acid leads to the artificial production of gall-nuts.—Sir HENRY ROSCOE, *President of British Association*.

To have established the fact that every chemical phenomenon may be represented in figures, denoting either number, measure,

or weight, such figures, when once accurately determined, remaining constant and unchanged through all time—this seems to me the crowning glory of modern chemistry. It is the firm establishment of this principle that has transformed the face of chemistry and has changed it from a mere descriptive into an exact science.

We seem to have arrived at the conclusion that the expression of quantitative results is the be-all and end-all of science; that all differences are merely quantitative; that there is no such thing as mere quality. The whole philosophy of our age is expressed in this one proposition: All differences within the sphere of our experience are quantitative. It is the basis of Darwinism, if I am not mistaken, and underlies many of our political and social theories. Of course it is a mere assumption if stated generally, for the phenomena that admit of purely quantitative expression are few in number compared with those that do not; but then it is surmised, and with some degree of probability, that the vast region outside the quantitative sphere will in time come to be included within it. The past history of science seems to render this likely in the future.

Mr. Crookes has called to his aid the doctrine of evolution, which has proved so valuable an instrument in the hands of the biologist, maintaining that the elements, like the species of plants and animals, were gradually evolved by some process of condensation from a primordial matter called by him protyle, each step in the process being represented by a distinct element.

Looking back at what has been achieved, I think we may entertain the confident anticipation that all the most important organic bodies, acids, alkaloids, and neutral substances will, in course of time, be obtained in a similar manner (by synthesis), though of one thing we may be pretty sure—viz., that we shall never succeed in forming any real organised matter as distinct from organic.

The term organic matter is, in fact, only employed for the sake of convenience, and as an expression handed down to us from former days, since so-called organic compounds are subject to the same laws with regard to composition as the bodies which we name mineral or inorganic, but organised matter such as we find constituting the vessels of plants and animals is a different thing.

The protoplasm contained in the vegetable and animal cell is something very distinct from the same matter after the death of

the organism, but the difference between living and dead matter is not of a chemical nature.

Will chemical science go on expanding and developing during the next few generations as it has done in the course of the last hundred years? Will discovery follow discovery, and fact be added to fact, until the record occupies not a few volumes only, but a whole library? Will systematic chemistry, *i.e.* the history and description of all possible combinations of the elements, have any limits? I am inclined to answer in the negative. All human institutions pass through the same phases; they have their rise, they culminate, and decay; and I do not see why the science of chemistry should form an exception.

I think it probable that in the course of time, at the rate at which we are now progressing, nearly all possible compounds will have been prepared, all the most important chemical facts will have been discovered, and pure chemistry will then be practically exhausted, and will be in the same condition as systematic botany and mineralogy now are. New compounds will now and then be discovered, just as new plants and new minerals now are, but nothing further will be brought to light that will affect the theories at which we shall then have arrived, whatever they may be.

The science will continue to develop, but in other directions than those previously pursued.—Dr. EDWARD SCHUNCK, *President, Chemical Section, British Association.*

The living human body—the chief object of your solicitude—not only combines in itself the greatest number of elementary substances and the most numerous organs and varied functions, so attuned to harmonious action as to illustrate the operation of every law of physics, every known force in nature, and every step in the development of living matter from the simple aggregation of protoplasm constituting the germinal cell to the full-grown man, but it is placed in appreciable and important relations with the material objects and immaterial forces existing in the world in which he lives. Hence a complete study of the living man, in health and disease, involves a thorough study, not only of his structure and functions, but more or less of every element and force entering into the earth, the air, and the water with which he stands in constant relation.

I hope to see added in every permanent general medical society two standing committees: one, to whom should be referred for critical

examination every communication claiming to embody a new discovery in either the science or art of medicine ; and the other should be charged with the work of devising such lines of investigation for developing additional knowledge as require the co-operation of different individuals, and perhaps societies, and of superintending their efficient execution until crowned with success. If 10 or 20 per cent. of the money paid for initiation and membership dues by the members of each society were appropriated and judiciously expended in the prosecution of such systematic and continuous investigations from year to year, it would accomplish more in advancing medical science directly, and indirectly in benefiting the human race, than ten times that amount would accomplish if expended in any other direction.—Dr. N. SMITH DAVIS, *Pres., International Medical Congress.*

Marriages of consanguinity, even when there may be the very rare event of freedom from all taint on either side, are well known to become, in the second, third, or fourth generation, the source of much deformity and misery—and this in spite of all special statistics to the contrary.

But there are marriages taking place daily, not those of consanguinity, but of unhealthy people, and of those who are actually suffering from developed disease, of marked hereditary character, or from as yet undeveloped taint, and that this often happens when the taint is very strongly exhibited in other members of the family. Let it always be remembered that hereditary taint, although undeveloped, is in itself diseased, and then the grave character of the responsibility of propagating it may be, if not duly, approximately gauged.

The brain of women is not improved by being roughened or overstrained ; and the emotional nature of man is enfeebled by this reversal of the order of Nature ; and we find the tendencies to disease inverted without any advantage to either. The physician may, I think, do much in counteracting this tendency of the present day : protesting, on the one hand, against all foolish pruderies, mock-modesties, and the like ; and, on the other, encouraging healthy habits of body and mind ; always bearing in mind that the highest type to aim at is the perfection of woman and the perfection of man, and not the production of moral and mental hermaphrodites, which, thank Heaven, are usually sterile.

The absence or deficiency of light, and especially of sunlight, shows its morbid effects in the impaired health of miners, navigators, workmen in cellars, in city offices, and in the night. The night working to which I refer is such as must limit the income of sunlight to a considerable degree. Those who suffer most are the reporters, literateurs, printers, writers, and many others whose work is nocturnal exclusively, and who require some distinct changes to be made in their habits. Anæmia is the prominent mischief brought about by deprivation of light; and anæmia means very much—very much more than mere pallor of the skin. There is no organ in the body which it does not affect; it cannot be uprooted by iron or food, or fresh air, or any other means save that of light; and we do well in prescribing this early in the anæmia of night-working men.

That which we denote "preventive medicine" when applied to individuals, becomes general "sanitary science" when we have to deal with masses; and it is only by a careful scrutiny of all the *causes* of disease that we can render that science as efficient as it ought to be.—Dr. J. RUSSELL REYNOLDS, on *Preventive Medicine*, at Congress of Sanitary Institute.

OBITUARY NOTICES.

WE regret to record the death, on September 13th, of John Wood, of Dumfries, L.D.S.Edin.&I.; D.D.S. Vanderbilt, Ohio. He was a member of the Odonto-Chirurgical Society and of the British Dental Association.

The death is also announced on the same date of William Henry Nolan, of Berners Street, W., L.D.S.Eng. (*sine curriculo*, 1863).

GOSSIP.

THE need for Technical Schools, where young workmen may perfect themselves in the various branches of their trades, which are so imperfectly taught in the general workshop, has been forcibly demonstrated by the result of an examination of plumbers, for which 117 candidates presented themselves, and only 32 satisfied the examiners.

DR. ASA GRAY, of Harvard University, has been presented with an honorary L.L.D. of Edinburgh.

THE *Jewellers' Journal* says :—" If 2 per cent of silica be added to gold, it can be melted over the flame of a common candle." This is not generally known, and it is well it is not, for sovereigns as a rule melt faster than their possessors desire.

CONSEQUENT upon the expansion principle in the compound engine of three cylinders, 350 tons of coal are now doing the work that formerly required 750 tons. For this statement we are indebted to the *Engineer*.

M. CHEVREUL, the director of the manufactory of Gobelin tapestry and author of the well-known work on the theory of colours, completed his one hundred and first year on the 31st day of August, 1887. He was born at Angers.

DRS. MACFADYEAN and Woodhouse, of Edinburgh, who have for a long time been at work on the origin of enteric tuberculosis in children, presented the results of their investigations before the recent meeting of the British Medical Association. The frequent occurrence of this disease in children led to a consideration of which article of diet was the medium for the conveyance of the bacillus, which is generally regarded as the cause of tuberculosis. They found that milk from a cow, affected by what is known as "grapes"—a tubercular affection of the udder—contained these bacilli in great numbers. The milk obtained from this cow was given to pigs, and in them tuberculosis was developed. In an institution supplied with milk from a dairy in which the bacilli were found in abundance, 40 per cent. of the deaths arose from phthisis. Which part of the milk, whey, butter, or cheese is the medium by which conveyance takes place has not yet been determined.

BATHYBIUS, which a year or two ago was regarded as the physical basis of life, has been shown by Mr. Murray, of the "Challenger," to be nothing more than sulphate of lime precipitated by the addition of alcohol from the sea water in which it was held in solution. Verily the science of yesterday has become a myth of the present moment.

DR. SCHUNCK has set forth the idea that chlorophyll—the green colouring matter of leaves—is an unstable body of complex constitution acting as a carrier of carbonic acid to the plant, just as hæmoglobin acts as a carrier of oxygen in the animal economy. If it be so, it probably explains how want of light causes etiolation, and why there is a deficiency of woody fibre in plants grown in the dark.

PROFESSOR SEELEY exhibited at the meeting of the British Association a fossil showing the development of the young of the plesiosaurus. In it could be clearly seen the substance of the flesh and the bones within them. The external form was in perfect preservation. It is the first example in which mineralisation of muscular substance has occurred. The circle of the eye was well marked.

LUTEO-COBALT PERMANGANATE is the name of a new explosive. It is prepared by mixing concentrated solutions of luteo-cobalt chloride, $\text{Co}_2 12 \text{N.H.}_3 \text{Cl}_6$ and potassuim permanganate in the proportion of 1 to 12 molecules, at a temperature not exceeding 60. On cooling, the salt crystallizes out in little black octahedra, which are lustrous.

No portion of the British islands demonstrates the work of frost more remarkably than the mountain peaks of Scotland. Frost does the work of a plough and splits the solid rocks into isolated blocks, wherever water can obtain entry.—*Geikie's Scenery of Scotland*.

PHOTOGRAPHS of lightning flashes have been successfully obtained, and will probably soon be among the scientific curiosities which can be purchased at a small cost.

A SUBSTITUTE for cocaine as a local anæsthetic has been found in an alkaloid named *Stenocarpine*. It is extracted from the leaves of a tree as yet not identified, but which closely resembles an acacia, and probably belonging to the mimosas, some species of which contain juices which are used in the West Indies and in South America for intoxicating fish without impairing their edible qualities. Four drops of a 2 per cent. solution diffused over the conjunctiva are said to be sufficient to allow most operations to be done without pain.

It is stated by Dr. W. H. Mitchell, in the *Dental Cosmos* for September, that he extracted without any pain a second molar tooth, after having laid upon the surface of the gum around the tooth a piece of cotton saturated with the solution. At present stenocarpine is not to be obtained in England.

THE grouse disease has been investigated by Dr. Klein. In all the specimens dissected, the intestines were more or less congested. The liver and kidneys, and in some cases the lungs also, were discolored. Bacteria were not found in either the tissues or in the blood, but carefully prepared sections of the liver showed under the microscope, everywhere, a large number of corpuscles of a fungus which are thought to be a *plasmodium* in an arrested condition of development. The subject is to be worked out more fully by the same distinguished investigator.

SOME large yachts have several tons of lead stowed away in the keel. It has been suggested that this lead should be utilized as a secondary battery.

IODOFORM has for so long been regarded as an antiseptic that any statement to the contrary is surprising. It is said by Heyn and Rosvy that, when sterilised, iodoform jelly was inoculated with micro-organisms, on the third day they were in full growth. One of these jellies was mixed with iodoform powder, and then injected into the knee of a rabbit. On the day following the animal was unwell, and the knee much swollen. On the third day some pus was taken from the joint, and from this, characteristic pure cultures were obtained.

THE bombardment of the atoms of the residual gas is considered to be the cause of motion in the radiometer. Herepath's view, particularly of hydrogen, is that its atoms, at a pressure of 30 inches, and a temperature of 60° must move with a velocity of 6225.54 feet per second to produce a pressure of 14.714 lbs. to the inch. A molecular cannonade far exceeding that of a cannon-ball is therefore maintained against the bounding surface of the glass bulb.

A CUTTING from the current *Dentists' Register* of the name, address, and qualifications of each person is now being sent to every one so registered. This should receive immediate attention. Every registered dental practitioner should be careful to answer, without delay, all inquiries sent to him by the Registrar of the General Medical Council, and also to send the Registrar immediate notice of any change in his address, in order that the *correct address* may be duly inserted in the *Dentists' Register*; otherwise, by clause 3 of section XII. of the "Dentists' Act (1878)" such dental practitioner is liable to have his name erased from the *Dentists' Register*.

THE annual circular of the *Medical Directory* for 1888 has been issued. All licentiates in dental surgery should see that their names are included in the volume now in preparation. Messrs. Churchill, New Burlington Street, W., are the publishers.

MESSRS. S. C. GIBBONS, L.D.S.Eng., J. H. Redman, D.D.S., L.D.S.I., and E. M. Tod, L.D.S.Eng., have been appointed dental surgeons to the Brighton Dental Hospital.

FOSSIL remains of an Arctic flora have been discovered in Sweden in calcareous tufa. This flora is represented in flowers of *Dryas octopetala* and *Betula nana*, which are now extinct in that locality, and in branches of *Empetrum* and leaves of *Vaccinium uliginosum*. It appears that the Arctic flora was followed by a pine vegetation which gradually supplanted it. In Jutland Arctic plants and remains of pines are found together in tufa, probably an instance where supplantation was in progress.

THE domestication of pigeons can be traced back through historical records to the fourth dynasty of Egypt, 2700 B.C. Pigeon flying, as a sport, was practised in Modena in 1327, and if the words of Pliny are to be believed, pigeons were used as a means of communication at the siege of Modena forty-three years before the Christian era. Pigeon races have been organized from Rome to Belgium, a distance of 900 miles; but the difficulties in passing the Alps are so great that the percentage of returners is very small.

THE altitude attained by the French aeronauts—Jovis and Mallet—on the 16th August, 1887, was 22,000 feet. They recorded a temperature of 7 above zero centigrade at 12,000 feet, and at 22,000 feet 3 below zero centigrade was registered. Glashier and Coxwell, in their memorable ascent at Wolverhampton, reached a height of 36,000 or 37,000 feet. These measurements reduced give $4\frac{1}{4}$ miles and 7 miles nearly.

ACCORDING to a paper in the *Trans. Royal Soc. of Edinburgh* (85, 86, p. 764), toothache does not occur among the Waganda tribe and no case of caries of the teeth was seen, though several hundreds of both sexes were examined. The teeth of this tribe are well preserved, and even in old people are little worn. If children's teeth do not appear at the right time, it is considered by the Wagandese to be unlucky; but they are not put to death as among some tribes.

AFTER the researches on the height of clouds, carried on by Professor Hilde Orandson and assistants at the Meteorological Institute at Upsala, the instrument employed to measure the angles is an open tube with brilliant lenses. The portion corresponding to the object glass of an ordinary telescope is formed by two fine wires crossing each other at right angles, and in lieu of an eyepiece there is a plate of brass pierced in the centre, with a circular hole one-eighth of an inch diameter. There are also vertical and horizontal circles graduated for the reading. Two such instruments are placed, one at each end of a base line of 4,272 feet. There are also at each end of the base two telephones—one for speaking, the other for hearing. A point of cloud being fixed upon for observation by telephone, each observer counts fifteen seconds, and adjusts his instrument to the part to be observed. At the fifteenth second they stop and read the various arcs, and the process is completed. The angles being determined, the height is calculated by a well-known formula, and controlled by an equation the result of careful investigation. The computation of each set of observations occupies about twenty minutes. The results show that the greatest height of any cloud yet measured is only 43,800 feet, and also that the mean summer level of the three stories of clouds is for stratus, cumulus, and cumulo nimbus 2,000 to 6,000 feet; strato cirrus and cumulo cirrus, 12,000 to 15,000 feet; cirrus, cirro stratus and cirro cumulus, 20,000 to 27,000 feet.

THE electric light on the Isle of May, at the mouth of the Firth of Forth, which was installed on the 1st of December, 1886, is on the arc principle. Its estimated power is from 12,000 to 16,000 candles when one dynamo is running. There are three lamps—one in use, the others in reserve. They are of the Serrin Bergo type.

IN replying to a correspondent, the *Medical Press and Circular* says: We are in accord with your view "that the contrary action of certain larger and certain smaller doses of each drug is a law of fact, and as such may be used as a guide in prescribing," "that it is not Homœopathy"; but when you come to your prescription of a grain and call this rational medicine, you must excuse us when we call it "humbug."

Mess

DR. J. MILNER FOTHERGILL says: The rule of the nurse is sound and physiological—pudding first! Such farinaceous matter should come first in a meal so as to let the starch become converted, which progress goes on before the stomach becomes acid. Then let the meat—the proper work of the stomach—follow in due order. Unembarrassed by starch floating about it and hampering its movements, the stomach can then deal satisfactorily with the meat.

MONTHLY STATEMENT of operations performed at Dental Hospitals, from September 1st to September 30th, 1887:—

Number of Patients attended...	London.	Birmingham.	Manchester.
	3,380	1,332	845
Extractions { Children under 14	481	1,205	615
Adults	1,120		
Under Nitrous Oxide	525		
		42	82
Gold Stoppings	130	11	11
Other Stoppings	355	102	70
Advice and Scaling	390	121	—
Irregularities of the Teeth ...	66	4	—
Miscellaneous	395	214	290
Total	3,470	1,639	1,068

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PRECAUTIONS AGAINST WASTE OF NITROUS OXIDE GAS.

By W. J. PIDGEON, L.D.S., Eng.,
Dental Surgeon, Bootle Borough Hospital.

FROM certain incidents which at intervals have fallen under my observation, it appears to me probable that a large amount of gas is constantly being wasted which might easily be saved. After a 100-gallon bottle has been standing unused a few days, it has sometimes happened that, although it may have been used for only one or two administrations, it has been found nearly empty, and instead of containing eighty gallons of gas, only ten have remained. A fortnight since I found, by weighing, a loss of about forty gallons from one of the bottles of the pair on my stand. I was much surprised at this, as I had been particularly careful in turning off after the last administration, having put such pressure on the tap as seemed to me amply sufficient for the purpose. It now proves on further trial that this bottle has a very stiff tap; so stiff that only by using all the force of both hands can I completely shut off the gas.

This convinced me that some safer test of thorough turning-off is necessary than the judgment one can form from mere muscular feeling, and that unless such a test be adopted the gas is always liable to waste.

After weighing the bottle in question, on applying my ear to the small rubber pipe leading from the union, I could distinguish a faint hissing sound. It then occurred to me that nitrous oxide stimulates combustion, so after lighting a match and allowing it to burn a short time, I blew it out and applied the red-hot embers to the orifice of the bottle. Its dull glow was at once brightened by the minute stream of gas escaping. This, perhaps, is the surest way of ascertaining that gas is thoroughly turned off.

One or two other points connected with this subject also occur to me: the bursting of the gas-bag, or of the rubber pipe connecting it with the bottle; the noise occasioned by the gas rushing through the latter in filling the bag; and the freezing of the gas.

I do not remember witnessing the bursting of a bag by force of gas; but several times I have seen this accident happen to the small tube leading to it from the bottle, and that is a very unpleasant occurrence in the midst of an administration.

This accident occurred to me a few months since. The small rubber tube was a thick one, and consequently burst with a very loud report. I turned off the gas and looked to my patient, whom I found to be, fortunately, quite unconscious, as all had gone well until he was about ready for being operated upon, though I had intended to render the anesthesia a little deeper had I not been interrupted. In this case, therefore, the patient was unaware that anything out of the common had taken place; but such is not the usual result of this annoying accident. In most cases a second administration is necessary, and the patient is apt to go away with the impression that "someone had blundered." It has always happened apparently in consequence of the gas freezing. It then spirts out in fits and starts, and under one of these sudden rushes the tube gives way. The risk of this can, I believe, be got over by keeping the gas in a sufficiently warm place. This freezing, too, is occasionally responsible for a waste of gas. The gas may cease to flow during an administration, and under the impression that the bottle is empty the administrator neglects to turn off the tap, transfers the key, and proceeds to use the second bottle in the stand. After the operation the first bottle used is put aside for refilling, the gas still remaining in it being lost. Instead of this, its tap should have been turned off before transferring the key to the second bottle. Then, by weighing or warmth, it might have been found that temporary stoppage in the flow of gas from a bottle is no proof of its emptiness.

It has occurred to me that the small tube between the bottles and the bag might with advantage be replaced by one of the same size and make as that between the bag and the face-piece. This would do away with the risk of bursting at that point; yet there would still probably remain the loud hissing of the gas in issuing from the bottle. The only plan known to me for obviating this is the adoption of a "quieter," such as that introduced by the Dental

Manufacturing Company. It occupies the position of the small tubing, prevents the danger of bursting, and causes the gas to pass quietly to the bag.

Each bottle of gas on arriving from the depôt should be carefully weighed and the tap tested. It is a good plan to place a stroke on the label of the bottle after each administration, in order to have a rough idea of the quantity of gas that should remain in it, and a check against undue waste. The quantity of gas used will, of course, vary with circumstances, as the constitution of patients, use of the supplemental bag, and the custom of administrators, some of whom push the anæsthesia so much farther than others; yet in all cases, by the adoption of the precautions I have referred to, and with due care in seeing that all connections and couplings are gas tight, to prevent loss during administration, much gas may be saved. Most certainly, by means of them, there need be no risk of such great and insidious waste as I have spoken of above.

SOME ASPECTS OF DENTAL SURGERY.

By P. SIDNEY SPOKES, M.R.C.S., L.D.S.Edin.

(Read before the Students' Society of the National Dental College.)

MR. PRESIDENT AND GENTLEMEN,—In casting about for a subject with which to claim your attention for a short time, it seemed to me that I might well leave to others the duty of treating strictly professional matters occurring in the actual practice of dental surgery; and I felt that, while recognising in the *raison d'être* of our Society a means of help in our daily work at the operating chair or in the workshop, I might perhaps be pardoned for not attempting to bring before you something to assist you in a *direct* manner. But I should like to think that, in an *indirect* manner, our work may be made easier by asking you to consider with me some of the different ways in which people outside our calling regard us and our doings, and also to attempt to form some opinion ourselves as to the present status of Dental Surgery as a profession, or even perhaps to arrive at some conclusion as to how far we may justly claim to be satisfied with the outlook in the future. I propose then, gentlemen, to treat shortly upon certain aspects of dental surgery which present themselves for our consideration, and I cannot but think that, in the free discussion

that may be expected to follow on a topic which affects each one of us so nearly, the individual expressions of opinion will be of much service. To this end I shall adopt a colloquial style for my paper, rather than attempt to set certain views before the Society in measured sentences. And it will be sufficient for my purpose if I treat our subject under three heads: the medical aspect, the popular aspect, and our own aspect. I think, sir, that we cannot do better than commence by attempting to ascertain how our particular occupation is regarded by the medical profession at large, and why certain views with regard to it obtain.

Medicos of old or middle age are apt to judge of the body of dentists at large by what they remember of 30 or 40 years ago, in spite of what their own individual experience may be; for although perhaps surprised, or at all events satisfied, by the treatment they receive, if they find themselves obliged to seek help from a modern dental surgeon, they may naturally infer that they are in the hands of an exceptionally good man, but that the ordinary run of dentists are much of the same mixed character as obtained in boyhood's days. Some of the older surgeons were fully impressed by the importance of the subject we interest ourselves in, and a tersely-expressed passage from Hunter will serve to illustrate this: "The importance of the teeth is such that they deserve our utmost attention, as well with regard to the preservation of them, when in a healthy state, as to the methods of curing them when diseased. They require this attention not only for the preservation of themselves, as instruments useful to the body, but also on account of other parts with which they are connected; for diseases in the teeth are apt to produce diseases in the neighbouring parts, not unfrequently of serious consequences." It would have been better for human suffering, as well as assisting in the more rapid development of our craft, if this view had been more forcibly impressed upon the general practitioner; but there can be no denying the fact that, in favour of other subjects which were considered more important, the practice of dental surgery has been ignored, and as a consequence there has been a tendency to undervalue the results which are obtained and a disinclination to recognise the necessity for special knowledge in this subject.

Again, the dentist has suffered from a suspicion on the part of the general practitioner lest the former might attempt to trespass upon the latter's preserves. Self-preservation is a law of human

nature, even among the highest professions. This, coupled with the knowledge that it is impossible to retaliate (in consequence of an ignorance of the principles of the practice of dental surgery) produces in the mind of the general practitioner an inclination to resent any attempt of the dental practitioner to range himself alongside.

Then, again, there seems to exist in the mind of some an idea that the mouth and its contents are not desirable objects to be constantly employed upon, and that there is something objectionable in most of the operations of dental surgery. This may be dismissed as a personal disinclination, but explains to some extent the contempt occasionally met with.

It would seem, gentlemen, that until comparatively recent years the medical curriculum made no call upon its students for a knowledge of dental surgery, and that, if it did not actually deny its necessity, it was content to pass it over in apathy.

In a book on surgery which I bought 13 years ago, and read for the purposes of examination, I find this (fine) passage:—"Extraction of teeth. Nothing which relieves human suffering ought to be slighted or despised; no wise surgeon, therefore, will fail to make himself acquainted with the way of pulling out teeth with dexterity. It is an operation which is easily performed by anyone who has the proper instruments."

It is not my intention, gentlemen, to travel over the history of the dental profession, although it is a very interesting subject, but I must content myself by calling your attention to one or two instances where the medical profession has expressed itself in such a way as enables us to form some idea of the general aspect of dental surgery and those practising it from the strictly medical point of view. In 1843, Mr. White, the President of the College of Surgeons, expressed himself to the fact that "the members of the College practising exclusively the dental profession were, in strictness, *seceders*." As Mr. Hill says, in his book on dental reform, "if this means anything, it means the seceders had retrograded, or, in simple phraseology, the individual had lost caste," and he says that this idea has been all along very pronounced, and it has not yet become extinct.

The *Medical Circular*, 1857, says: "A certain section of the profession seem to think that the College of Surgeons should examine men as to the most scientific way of taking moulds of ill-

conditioned jaws, and of making false teeth from elephants' tusks. In that case Lawrence must commence an apprenticeship at the bench, and Stanley take a turn at the lathe. We have no objection to this, only that we should soon make a demand for a new College of Surgeons." Numerous other quotations could be given from the medical press of that time, showing the disdain, not to say contempt, exhibited to the practice of dental surgery, and after the institution of a special qualification there was a fresh outbreak. Here is a specimen, prompted apparently by jealousy: "There can be no doubt that if the dentists avail themselves to any extent of this offer, and connect themselves parasitically with the College, it will be with the intention of practising as surgeons under the ægis of the College diploma. Every petty town in the country will have its certificated dentist poaching upon the practice of the fully qualified man." Coming to a more recent date, that period in the evolution of dental matters marked by the birth of the *Dental Register*, it will suffice if I conclude with the following bitter attempt to snub the growing science. It is from the *Lancet*, October, 1880: "It is interesting to notice the many proofs of ignorance or carelessness on the part of the public in reference to the Dentists' Act. So far from that statute having any protective value to the community, it is, as we predicted it would, and asserted it must be, a delusion and a snare. At present the *Dentists' Register* is a list of all the persons, with or without knowledge and qualification, who were or claimed to be in the habit of tooth-drawing or making at the passing of the Act. Hereafter, that is to say when the present race of 'dental surgeons' shall have died out, the register will comprise the names of those imperfectly educated and half-qualified persons who are simply licentiates in dentistry and nothing more, together with such fully-qualified *surgeons* as may elect to have their names classed with the professors of a 'specialty' which, in so far as it is *surgical*, cannot in the very nature of things have any really independent existence. We venture to think the number of medical men so minded will be exceedingly small. Meanwhile the drawers of teeth and hewers of jaw-bones luxuriate in the possession of a register on which we regret to find the names of a few surgeons. They also call themselves 'surgeon-dentists' and 'dental-surgeons' at pleasure, although there has been nothing surgical in their education, and they have no conceivable right to the title they claim." This

passage, gentlemen, is not pleasant reading, and it is difficult to understand the meaning of some of it, written apparently without a proper knowledge of the true facts. Doubtless there has been good reason for some of these remarks, and let us hope these strictures and criticisms have borne good fruit and assisted in making our profession what it is now. There was no other just way than to place all those practising upon the register. The profession could not afford to lose from its ranks many able and even scientific men, perhaps not holding any legal qualification, but honest workers, preparing the ground over which we are treading. Let us acknowledge our indebtedness to them while accepting as a consequence the admission of many others who can bring us no credit, who are incapable of appreciating the opportunity, they seem anxious to destroy, of sharing the privileges of a profession. So that, speaking generally, the medical aspect of Dental Surgery shows practically an ignorance of dental work and a strong disinclination to be associated with it or those practising it. This certainly is relieved here and there by the attitude adopted by some of the more broad-minded men who are willing to recognise the just claims of dental surgery, and a good antithesis to what I read just now may be found in the words of Sir James Paget, March, 1887: "From this time onwards you will arise, not only in utility, but in public estimation. All those students who are well educated will be admitted to the register, all will be welcome, and all will be held as members in common with the great profession of medicine in England."

However important it may be for us to secure a proper recognition from the main body of those practising the healing art, I imagine that few present will be prepared to deny that a more serious duty (and one closely affecting our daily work) is to command a satisfactory verdict from the outside or popular world. If we succeed in this the other must follow. The public at the present moment judge us by personal experience. An opinion is formed of the profession at large according to the treatment received at the hands of an individual member of it, and in considering this subject it becomes necessary to look at a matter which is equally important in the other professions—the matter of fees. If a dental surgeon by his method of practice conveys to the mind of his patient that i.e. (the patient) may

expect the treatment usual from the members of the liberal professions, and not the mere sordid considerations of commercial life, he will the more readily be prepared to exchange the *quid pro quo* and recognise the fact that he is receiving a benefit, the result of brain as well as muscle. Now, gentlemen, I postulate that in the mere fact of doing good work honestly at a comparatively low fee there is nothing in itself derogatory; by this I mean that a practitioner has a moral right to adopt the margin of profit to the poorest of his fellow-creatures who may desire his aid and can afford to give him the necessary margin at all, and here we touch upon the ever-recurring and hydra-headed question of attracting public attention and soliciting the confidence of suffering humanity by means of well-chosen wily words and brazen statements.

I object to anyone claiming a share of the respect due to an honourable profession who so far forgets himself as to promise that which he must know he cannot perform. When a man undertakes to do something better than his fellows for less money the mere fact of his being obliged to resort to a public announcement of it carries with it the proof that he is a liar. There may be some distinction between the gilt-edged presentation copy, sown wide-cast, of "Diseases of Dental Organs, treated by a New Method" and the show-case containing a sun-bleached collection of celluloid horrors, but it is a distinction without a difference so far as motive is concerned. "I am a wonderful fellow, but people will be too stupid to find it out unless I force the knowledge upon them." There are, no doubt, men who would willingly see all advertising suppressed, but excuse themselves on the ground of self-preservation. In my opinion, however, they are mistaken, and could afford to give their patients better work by saving the advertisement money for the workshop. What, gentlemen, must be the effect of such conduct and its results which I thus briefly allude to? The aspect of such dental surgery from the public point of view must be unsatisfactory. The disappointment is the same as arises from a trial of some vaunted nostrum, as when a sufferer with malignant disease tries box after box of "peristaltic persuaders" because they are guaranteed to "cleanse the blood." The general practitioner has the same sort of thing to contend with, but not to the same extent, for the public has had a longer time in which to distinguish between

the true and the false. There is another point which, perhaps, affects us unfairly—while the disgusted patient, generally, does not hesitate to proclaim from the housetop his unfavourable opinion, it frequently happens that some of the better class (especially of the opposite sex), whose experience properly expressed would do good, nevertheless prefer to keep their mouths shut, from motives which we all understand. The old-fashioned idea, which pictures a dentist principally as an extractor of troublesome teeth, is still maintained to a considerable extent and his most beneficial and skilful work is not sufficiently known. So, then, we must acknowledge that, at present, the aspect of dental surgery from the outside world is as unsatisfactory as the strictly medical aspect, and we find the principal cause operating is the same in each case, viz.—a lack of knowledge of the benefits to be obtained if looked for in the proper direction.

And now, gentlemen, for a few moments let us consider our own aspect of dental surgery, and then I will conclude with a speculation as to the future. And, with the object of eliciting a general expression of opinion, I will shortly state my own views, which I naturally, but with all deference, hope may be found in common with those of the members of the Students' Society.

“In the course of my long life,” said the Khalif Ali, “I have often observed that the men are more like the times they live in than they are like their fathers.” If this profound remark be true generally, it is true especially with regard to dental surgery. We are no longer content to practise our art separately from one another, jealous even lest any improvement may become too widely known to our brethren, but each is anxious to share any advantage with his fellows. In consequence, with our altered surroundings, we may justly be proud of our profession as we find it to-day. Modern dental surgery, from my aspect, is nothing more, nothing less, than a department of general surgery. It differs from others in a detail for which I think we may claim credit. We do not, as the orthopædic or ophthalmic surgeon, write an order to an instrument maker, but it becomes our duty to arrange, personally, the apparatus necessary for our patient's relief.

With our improved methods of teaching, upon which I must not enlarge, with our Register, to which none can be admitted without proper qualification, with the mutual intercourse usual throughout the medical profession (of which the existence of such

a Society as this is an example), and with the several other advantages which now obtain, I think, gentlemen, we may express satisfaction.

We have amongst us men who can claim an equality with other shining lights as specialists. We have amongst us men who are qualified to educate and teach the public by their writings, able and willing to call upon the State to awake from its apathy and recognise the importance of subjects which we know ought to be properly appreciated. When we reflect that this improved state of things has arisen within the comparatively short space of thirty years, it encourages the hope that, by maintaining the same efforts in the same direction, we may secure a still more satisfactory condition. The Register shows now a total of 5,200, being an addition of only two upon that of the previous year. Of these, 932 are licentiates—about $18\frac{2}{5}\%$ —but of course this proportion will increase year by year. There is an increase in the general medical register of 454. And if, as we believe, the field for labour is not contracting but expanding—that the demand for your work is increasing rather than diminishing—you, gentlemen, in helping to afford the corresponding supply will have the opportunity of guiding the practice of the profession in the right direction. In my humble opinion, it behoves each one of us to reflect that every action must tend for the good or ill of those who follow after. But, gentlemen, it would ill become me to say anything in the way of a lecture, even if it were necessary; all I mean is that, as the aspects of dentistry from the outside become more inviting, we must expect a considerable addition to our ranks. Let those who join us find themselves compelled to acknowledge an obligation to continue in the right path, and let us assist them by setting our faces against anything dubious.

A new-comer finds in modern dental surgery a science built upon the broad foundation of extended pathological investigation, supported by a genius of invention which has produced wonderful results. In the great battle with caries we have a variety of weapons ready to our hand, and when receiving a check (sometimes from causes beyond our control at present) we have an anæsthetic—the dental anæsthetic *par excellence*—which enables us to rob a painful, but sometimes necessary, operation of its greatest horror. And so in the other diseases we have to do with; there is little that is really empirical in the treatment.

And now for a short dream of the future. It may be that Dental Surgery will itself produce specialists. Some men who excel in filling may leave to others the devising of artificial dentures. Then there may come the extension of a trouble which already exists and occurs in general medical practice as well, where a qualified man has several separate establishments covered by his name, but practically worked by unqualified and irresponsible men. There can be no exception taken to a practitioner availing himself of an assistant, but any increase of the wholesale violation of the Register should be opposed. Then, in the future, there will be an extension of the curriculum and a greater stringency at examination. This process is going on continuously. Perhaps at some time there may be a State examination, an examination for the whole of medicine and surgery, conferring a distinctive title upon all alike, with special conditions for those avoiding general practice, each candidate being allowed to declare his special subject in which to be more thoroughly examined to the exclusion of others—*e.g.* dental surgery instead of midwifery. And apart from a development or modification of our manipulative processes we may expect improvements in our therapeutic agents and discoveries of new ones, possibly or probably some alkaloid as a pain-obtunding remedy, thus breaking down the last obstruction in the way of a pleasant visit to the dentist by ignoring sensitive dentine. There may also come improvements in the mechanical department, vulcanite or even the noble metal being superseded, as well as an overshadowing of such architectural and engineering products as crown, bar, and bridge work. But I will not weary you longer, gentlemen. There must be a steady progress before us, but it is difficult to prophesy unless one knows. What we may reasonably expect is an improvement in the outside aspect of dental surgery. The general practitioner and the public are educating each other in this respect. They will awaken to a wider knowledge of the importance and necessity of early attention to the teeth and of the more satisfactory results attained. This will come about, no doubt, as a consequence of honest, sterling work on the part of conscientious, humane operators, as well as from the increased interest taken in all matters affecting the human body, due to an enlarged method of education. This will occur, too, in spite of, and not in consequence of, puffing advertisements, and just in proportion as people are enabled

gradually to understand the difference between good work silently done and rough work bolstered up with blatant bellowing, just so quickly forwards will be the march of the practice of Dental Surgery as a profession.

It will be for us to force, at their hands, a recognition which shall be the more full because the longer delayed, and if, as I believe, future generations of dental surgeons may lay claim to an honourable and humane profession, then, gentlemen, I imagine that Dental Surgery will itself be able to ignore any, if such there shall be, who may prove discourteous or narrow-minded enough to refuse the right hand of fellowship.

REVIEWS OF BOOKS.

A SYSTEM OF DENTAL SURGERY. By Sir John Tomes, F.R.S.
Third Edition, revised and enlarged by Charles S. Tomes
M.A., F.R.S. London: J. & A. Churchill.

FOR a text-book, to maintain its usefulness and its position in the field of literature, it should be kept abreast with the knowledge and requirements of the times. This observation applies with full significance to such a work as "Tomes' System of Dental Surgery. The second edition having been published in 1873, there were many reasons why a new edition should be now available. Scientifically, the third edition of this well-known work is all that could be desired, the more recent facts, received opinions and methods of procedure, being included in the text. From a literary point of view, it is not so successful.

It is proverbial among dental students, that "Tomes" is difficult to read. As an example of inexplicit expression, we may quote from p. 248: "But supposing a section from a carious tooth in which the destruction has been gradual, be taken, the following conditions may be observed." Also the first sentence on p. 434 is of the same character. Yet it is not only in the construction of phrases and sentences that the difficulty is experienced, but there is a want of conciseness in expression, in arrangement of sub-headings, and in grouping or clearly setting forth the main points under consideration.

The chapter on "Treatment of Exposed Pulp" is a specimen of such shortcomings. Under that heading there is first discussed the treatment of a healthy exposed pulp; then come the

diseases of the dental pulp—irritation, acute inflammation, and chronic inflammation—and their treatment. But there is no distinct title signifying "Diseases of Dental Pulp," though the term is used in the index. And under those three named conditions we presume all the forms of disease of that structure are included, but they have no special designation nor arrangement.

The present edition differs very materially from the previous one. A considerable amount of matter has been cut out, including nearly all that of the chapter on the structure of the dental tissues, which properly belongs to the region of Anatomy. That portion which has been retained forms part of a new chapter on "Defects in Structure." The chapter on "Caries" has been largely re-written, embracing the matter which formed the "Appendix" to the second edition. Much that is new has been added, there being twenty-nine additional pages, the measure of the page also being larger, and there are twenty-nine new illustrations, making a total of 292.

Irregularities of the teeth are differently defined and re-arranged, with much new matter added, including a description of the application of the jack-screw and the split plate.

Regarding the effects of syphilis during intra-uterine life, and consequently upon the temporary teeth, an opinion, given some years ago by Mr. Jonathan Hutchinson, is summarised thus: "Inasmuch as specific inflammations do not occur during intra-uterine life, the teeth belonging to the deciduous series are not liable to be affected." It may be interesting and instructive to here quote from Mr. Hutchinson's recently published book on "Syphilis:"*

"Enough of pathological evidence has, however, been recorded to compel us to admit that the fœtus may itself suffer from syphilis, and may exhibit lesions of the viscera, bones or skin, which conclusively denote it. Such lesions are, however, rare. It is a most noteworthy fact that if syphilis affects the fœtus, it almost invariably causes its death, for nothing is less common than for an infant to be born alive with extant signs of taint.

"Both the syphilitic and mercurial abnormalities of the teeth occur only in the second set. Since both are due to influences brought to bear upon the dental sacs, at a time when the crowns of the temporary teeth are calcified and beyond risk of damage,

* "Syphilis," by Jonathan Hutchinson, F.R.S. London: Cassell & Co.

defects in the first set of teeth are, for the most part, to be referred to influences existing during intra-uterine life. Thus it is very possible that proneness to premature decay, often observed in the milk teeth of syphilitic infants, may be due to mercury given to the mother during her pregnancy."

Under the heading of "Inflammation of the Alveolar Periosteum," there is discussed the question of the septicity of decomposed dental pulps and of alveolar abscess. The following extract, from page 461, is worthy of special attention:—"A point of the utmost interest, and indeed of very practical importance, is whether inflammation, and consequent alveolar abscess, is in all instances of a septic character. . . . Elsewhere in the body suppuration does occur in places which are apparently inaccessible to germs, and the frequent occurrence of gum-boils after exposure to cold, to mechanical irritation, and such causes, seems to point to the introduction of germs not being an absolutely essential element in the process."

. . . "When pulps have died as a consequence of a blow with no breach of surface, it is not uncommon for no abscess to ensue, though often a slight swelling is to be felt about the root. When, for the purposes of treatment, the tooth is opened up, it is not a rare thing for the slumbering abscess to be lighted up into an active, not to say violent state, perhaps owing to the entrance of germs."

"But sometimes the pulp will be found liquified, and in a state of stinking decomposition; and, so far, I have failed to find any evidence of the presence of organisms. Here is a dilemma: on the one hand, if germs are there, how can they have got there? on the other, it is pretty generally believed that stinking decompositions do not take place without them; yet here we have one where germs have not only not been found, but where it is difficult to suppose they can have got access. And further, such teeth are capable of setting up the most violent abscess without ever having been opened; so that we have the whole train of events—putrefaction, apical inflammation, and abscess—without any communication with the outside. It may be said that germs were there circulating in the blood, and that they only could grow and multiply when the vitality of the pulp was destroyed by the blow; but so far they have, if this be the case, eluded discovery."

A marked improvement is observed in the revised definition of "Necrosis of the Teeth." "After the death of the tooth-pulp the tooth may long retain an organic connection with the part outside

it by means of the cementum, and usage has led us to speak of such a tooth as a dead tooth, though, in fact, it is not wholly dead. But usage has likewise limited the term 'necrosis,' which really means just the same thing, to that more complete death in which the cementum is likewise involved." It would certainly be a great advantage, and a step in the line of progress, if some other term were applied to pulpless teeth, and "necrosis" limited to express death of the cementum.

The distinction between odontalgia and neuralgia is thus expressed: "When pain is distinctly referred to a tooth or teeth we speak of it as odontalgia, but when the tooth is free from pain, or the suffering in other parts is so great as to distract attention from it, we speak of it as neuralgia." In revising this chapter on neuralgia (pain in a nerve) it would have been well to have limited the use of the term "nerve" to denote neural fibres, rather than to signify tooth-pulp—a loose mode of expression, occurring four times on p. 551.

Sufficient has already been said of the third edition of this valuable and well-known work to show that much useful information has been added, and that it has been brought up to the more advanced knowledge of the present day; furthermore, there is not the least doubt that this work will maintain its high place in dental literature as "A System of Dental Surgery."

DENTAL CARIES AND ITS PREVENTION. By Henry Sewill, M.R.C.S., L.D.S.Eng. Second Edition. London: Ballière, Tindall & Cox.

In the preface the author says: "The continued demand for this little book has induced me to propose a second edition. With the exception of a few additions, alterations and corrections, the text remains unchanged. No new facts have been established since the first edition was published, and nothing has been urged to cast doubt upon the truth of the views I have endeavoured to make clear."

ANOTHER PROFESSIONAL HOLIDAY.

THE INTERNATIONAL MEDICAL CONGRESS.

By GEORGE CUNNINGHAM,

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WHAT, another! Yes, another, Reader; and since probably you were unable to attend the International Medical Congress for some very good and potent reason, and not from any lack of interest, the

Editor has assured me that I may be egotistical enough to assume that you will be interested in hearing something of our experiences. But, stay, I had almost forgotten ; one of the facts borne in upon me by this very visit was that some of the RECORD readers hail from the other side. To my American reader I would say that I trust the bigness of his heart and the liberality of his mind will prevent his finding mine too plain or too unvarnished a tale.

It has been stated that "as far as English dentistry is concerned, it is not going too far to say that we were not represented," and that "the leaders of the English profession" held back in a most regrettable manner from the Congress.

I certainly think the English contingent at the Congress was not quite so unrepresentative, when we consider the distance by sea, the expense, and the time required. As the following list shows, the Odontological Society was represented by a past president, a present, and two past secretaries, and eleven other members ; the British Dental Association, by none of its leading officials, it is true, but by at least eighteen members, including five past or present presidents of branches, and about twelve past or present members of the Representative Board ; and our Schools and Hospitals by two deans and some eight or more lecturers. London : Messrs. J. Walker, Mummery, R. H. Woodhouse, Woodruffe, West, Clayton Woodhouse, T. G. Read, I. Clifford, Wedgwood. Provinces : Messrs. Gaine, of Bath ; Harrison, Sheffield ; Harding, Shrewsbury ; Huxley, Birmingham ; Gartrell, Penzance ; Cox, Jersey ; Brand, Exeter ; Hargrave, Southport ; and Cunningham, Cambridge. Scotland : Messrs. Macleod, Edinburgh ; Campbell, Dundee ; and Fraser, Inverness. Ireland : Professor Stack, Dublin. Canada was not so well represented as we had hoped, and we only know of Dr. Willmott, of Toronto, being present. France was represented by M. Paul Dubois, Directeur del'Odontologie, and Professeur Suppléant, à l'Ecole Dentaire de Paris, and Dr. Kuhn, of Paris. Germany, by Professor Dr. Busch, Director of the Berlin Dental Institute, and Dr. Calais, of Hamburg. Holland, by Dr. de Travers, of Amsterdam ; and Sweden, by Herr Sjöberg, of Stockholm.

Owing to the difficulty of obtaining berths during the month of August, when all the Transatlantic steamships are full to overflowing, our little party of five was unable to leave Liverpool before Saturday, August 27th. Packed like sardines on the tender, we

were only too eager to exchange its discomforts for the comparative freedom of the Cunard R.M.S. *Servia*. The scene that followed may be described as chaotic. Like knowing travellers, we immediately rushed below to secure the choice of places at table from the chief steward, and the most convenient time for our bath from the bath steward. This, it should be remembered, is no unimportant factor in conducing to one's comfort on board ship.

On Sunday morning we anchored in Queenstown Harbour, and availed ourselves of the opportunity of going ashore to meet Professor Stack, of Dublin—a welcome addition to our party. We found our genial travelling companion full of interest in the coming meeting of the British Dental Association in Dublin. He improved the shining hour by introducing me to a gentleman connected with Trinity College, Dublin, and who has rendered valuable assistance to the British Medical Association in their Dublin meetings. As the tender sailed away from our ship with this and other friends on board, we concluded that the prospects of the Dublin meeting were very bright and promising.

The ocean voyage was the most invigorating and the most health-giving part of our holiday, while to some of us, at least, it was most enjoyable, despite the fearful overcrowding. The voyage was, happily, uneventful, the weather generally unsatisfactory, and the company, as a rule, extremely genial and pleasant. The presence of a considerable number of medical men, also going to the Congress, conduced largely to a pleasurable extension of the acquaintanceship of our own special party. Some members of our own party rendered valuable help in organising a very successful concert for the benefit of the Aged Seamen's Home. Our greatest disappointment was the recognition of the fact that, in consequence of the bad weather and two days' fog, we would be unable to reach New York, as anticipated, on the Sunday, and therefore we could not reach Washington in time to take part on the opening day of the Congress.

The one real charming day we had on board was our last; but when one ought to have revelled in the luxury of a flannel suit, our go-ashore clothes were imperative; and the one day when it would have seemed almost perfect bliss to have lazily lolled on deck in your steamer-chair, that comforting "article de voyage," was already carefully packed for going ashore. The whole crew seem to have entered into a conspiracy that, though still with

the ship, you were not of it, and the ever welcome luncheon-bell was at last unwelcome by its sounding some two hours before its wonted time. As we neared Sandy Hook the normal aspect of the ship was entirely changed. All was worry, bustle, and confusion; no wonder, some six hundred passengers, with no end of baggage, preparing to land, makes one painfully conscious of the "friction" of travel. Just off the island a shout went up, "Visitors to the International Medical Congress step this way." A vain effort was made to call our party together, but at length a gentleman who was "bossing" this arrangement, and who, I understand, is the Medical Officer of Health for the port of New York, remarked that perhaps it didn't matter; he only wanted to give us these circulars. We were thereupon supplied with a circular which informed us in English, French, and German, such useful information as the following: the date of the Congress; Washington is two-hundred miles from New York; and foreign steamers land at New York, Jersey or Hoboken. We were also informed that the New York Bureau of Information had engaged a reception parlour at the Hoffman House, where we would get all information and railroad tickets at reduced rates, &c., and where we were requested to make our way immediately on landing. Accordingly, after having safely but laboriously passed through the two hours' purgatorial stage of the Custom House, we found ourselves obliged, owing to the shortness of our time, to indulge in the luxury of a carriage to the Hoffman House, little more than twenty minutes' drive—2 dollars 50 cents.; that's all. Imagine our disgust to find that there was no Bureau of Information at the Hoffman House, no reception committee, no railroad tickets at reduced rates. A little parley with the coachman who brought us to the Hoffman House ended in our being transported to within some fifty yards of our starting point, for the more reasonable sum of one dollar. Here we just had time to cross the ferry and catch the train to Washington. We hear so much about the comforts of American travelling, we must be excused the remark that we were all starving when we started, and more than starved when we got to Washington, as the only refreshments obtainable on the train were fruit and iced water, and, alas! no comforting luncheon basket or "snack" at a handy buffet alongside as the train drew up in a station. On arriving there late on the Monday night, owing to a deplorable blunder, the rooms we had all along

fancied we had secured for ourselves were not to be had. Tired and weary after a fruitless effort to get a decent supper, we were fain to roost as best we could, two in a bed, amidst the improvised comforts of a commercial stock room.

On arrival at the hotel we had seen a few gentlemen skirmishing round, all bearing—with more or less dignity—three inches of broad blue ribbon, which formed an effective background for a large bright white metal medal. Our immediate and not unnatural conclusion was that some large teetotal conference was being held in the city. Early next morning, however, on registering our names at the central office, we found that our first act—oh, Christopher Columbus!—of participation in the Ninth International Congress was adorning ourselves with this conspicuous and Sunday-school-like badge, consisting of a medal with the head of the discoverer of America on the one side, and the Capitol of Washington on the obverse, suspended from a clasp bearing the inscription, “Ninth International Congress, 1887.” A sigh of relief escaped us, however, when we saw we were spared the further decoration of our persons with an extra and a larger badge of red or white, in addition to the other, from our lack of official connection with the Congress. In addition to the badge, we had a certificate of registration, but the badge was naturally utilised as a conspicuous and convenient passport to all the various meetings, entertainments and exhibits, in connection with the Congress. This led to some ingenious but unscrupulous individual or individuals forging the badge, though how issued, where obtained, and for what consideration other individuals were found mean enough to wear the forged decoration we know not. The incident, however, is worth mentioning, more especially as the discovery was made that tickets for the banquet had been so successfully forged that a fresh issue had to be made, which was only obtainable on having the certificate of membership punched.

Armed with our credentials, we quickly made our way to the clinics at the Franklin Institute. By eleven o'clock, the majority of our section adjourned to the regular meeting in the Universalists' Church, near by. The interior was rather more like a good hall than a church, and after a little time that natural feeling of strangeness at this utilitarian application of a place of worship passed away. The place of meeting also served to imbue with an unwonted naturalness that tone of ecclesiastical oratory which characterises

more or less, the scientific proceedings of some American dental societies.

As a fairly good abstract of the proceedings has already appeared in the pages of this journal, it will be unnecessary to enter into any account of them here; suffice it to say that, many of these papers on being printed *in extenso*, will be found not only to be full of interest, but of considerable scientific importance. As a general rule, the discussion following each paper was opened by some member of the section who had had an opportunity of making himself acquainted with its contents. The majority of speakers seem fully to understand, in the face of such a mass of material, with only a limited time at command for its prehension, the necessity of concentrating their remarks; with the natural consequence that we rose from the feast of reason not surfeited but often rather in the condition of belief that we scarcely had had enough. All this greatly contributed to the success of the meeting, and no small mead of praise is due to Dr. Taft, the president of the section, for his discreet and judicious control of the discussions. An idea of his courage in this capacity may be inferred from his daring more than—

"To beard the lion in his den,
The Douglas in his hall;"

namely, to officially check the seething eloquence of the inspired patriarch of American dentistry. Yet, truth to tell, the meeting would not have seemed complete, certainly not representative, had we not had an opportunity of being "inebriated by the exuberance of his verbosity, of being confused by the obscurity of his own perspicacity, and being dazzled by the paradox of his inspired affirmations in matters pertaining to dental science."

The afternoon session, which was held in the National Theatre, will probably be the one which will dwell longest on the memory of those who were fortunate enough to be present, both from the scientific interest and value of the papers read, and from the excellence of their illustration by means of the stereopticon. Dr. Andrews, of Cambridge, Mass., by his illustrations, maintained that he successfully proved, as Klein years ago asserted, that the origin of the dental fibril was not from the square-ended columnar odontoblast cells forming the outer layer, but from the pear-shaped cells forming the inner layer. It must be admitted that his preparations certainly bore out very completely the statement of his views. The only preparation in which this did not seem to be the case

was one where the fibril seem to be distinctly continued from one of the square-ended odontoblasts, which he accounted for by the statement that the square-ended cell simply obscured the pear-shaped cell behind, whence issued the fibril. His theory as to the origin of the contents of the dentinal tube is not new, but his investigations are none the less valuable on that account. It would be premature, before the complete publication of the paper, to say more than we have already done, except to express a desire for more frequent opportunities of participating in so interesting and so effective instruction in dental histology.

The series of illustrations of protective dentine, and the description of them communicated by Dr. Fletcher, of Cincinnati, were equally commendable, though they did not give rise to the same amount of controversy as the former paper.

While the darkened theatre was eminently suited to the purposes of the foregoing papers, we must express our sympathy for Mr. Howard Mummary, who was obliged to read a paper and display his photo-micrographs of the various dental structures under very unfavourable circumstances. His artistic and exceedingly instructive collection of photographs were, however, examined more leisurely afterwards by those most interested in the room specially devoted to microscopy, at the Franklin Institute. A large number, however, of those attending the Congress must have missed seeing this valuable contribution to scientific illustration.

An editorial in a contemporary has made me feel uncomfortably "blue," by the following statement :—"No really important paper was offered by an English dentist, dealing in an exhaustive way with professional matters." Well, perhaps so ; but I hope not. I trust it is something more than conceit that makes me think that an article, dealing with the results of five years' carefully kept records of over 500 cases of treatment of abscesses and pulpless teeth—all carefully tabulated, and demonstrating in no uncertain manner the value of the immediate method—should be considered a really important paper of an exhaustive nature.

A statement was made in the daily papers that not more than fifty persons, as a rule, attended any one of the section meetings in the afternoon at the same time, and at many meetings the papers were read to an audience of less than twenty people. At no time of the whole Congress was such a statement anywhere like true,

so far as the dental section was concerned. In fact, despite the resolve to read many of the papers contributed by title only, it was found necessary to hold a special evening session on the last day of the Congress, at which the attendance was almost, if not quite, as large as on the opening day. This session was fittingly terminated, after the well merited votes of thanks accorded to the President and the Secretaries of the section, by a short valedictory address from the chair, couched in terms of justifiable congratulation at the success of the section, tinged with a sad regret, heartily reciprocated by his audience, at its premature close, and anticipating as brilliant a reunion in the advancement of the cause of dental science at the Tenth International Medical Congress, to be held in Berlin, in 1890.

Regarding the doings of the Dental Section of the International Medical Congress, it would be only natural and just that I should endeavour to give you some idea of what, to our English minds at least, constituted the main feature of the meeting, namely, the clinics. I use the term endeavour very advisedly, for, to tell the truth, it was simply an *embarrasment de richesses*. Each morning the session began at the very American hour of 8 a.m., and a worthy but often fruitless effort made to close the clinics at 10.30 a.m. At each of these sessions there were on an average about twenty operators. The fatigue of a previous day's proceedings, increased no doubt by the social duties of the previous evening's Congress gathering, marred the execution of our well-meant and ever-renewed intention of being present at this very matutinal exercise. One was always certain, however, of finding the rooms thronged by 9 o'clock, and in the event of some especially interesting operation being on hand, almost an impossibility of getting within profitable distance. Add to all this the almost ceaseless greetings and inquiries of friends, old and new, then it may be understood how impossible it would be for any one man to give but an indifferent account of this part of the work.

The Committee on Operative Dentistry and Oral Surgery in charge of the Clinics, but especially the able and assiduous Chairman, Dr. C. F. W. Bödecker, must be congratulated on the excellence of their arrangements. The Franklin School Building, in which they were held, was eminently adapted to the purpose. Some four or five large rooms, on the same floor, all excellently lighted, with the spacious entrance-hall, served to relieve that

excess of crowding which, under these circumstances, is so detrimental alike to operator, patient, and spectator. Most of the chairs, with the operating tables and equipments, were securely railed in, while in some instances a kind of raised platform in tiers served to extend the field of operations.

The description of a few of the clinics which I saw, will give some idea of the others. The demonstration which excited most interest was naturally that of implantation, and of all the operators who performed this operation the greatest desire seemed to be to see the operator who had, if not invented, at least discovered the means of bringing it within the range of practical dentistry. The operation which I saw Dr. Younger perform was further increased in interest by the recognition of one of the English contingent in the chair as a patient. I immediately exacted a promise from our friend Gartrell, of Penzance, to give me an account of the operation from the patient's point of view. The patient was forty-eight years of age, and had lost two lateral incisors some four years ago, and had hitherto worn a partial upper plate. The alveolus was considerably absorbed, and the gum formed the usual marked crescentic depression between the central and the canine on each side of the mouth. A median incision was made from the centre of the labial aspect of the central incisor across the depression to the corresponding centre of the labial aspect of the canine, and the gums dissected from the alveolus for some little distance. After selecting two trephines, which corresponded with the two principal average diameters of the root of the tooth to be implanted, he began with the larger one, estimating the depth to which he should carry it by a reference to the measurement of the length of that part of the root. He then followed with the smaller trephine, and similarly formed a cavity for the upper part of the root, and then with a giant cone bur he tapered and formed the apex and sides of the cavity, meanwhile trying the tooth to be implanted several times. In a wonderfully short time the tooth was placed in position and firmly ligated with silk. In this case, on examining the artificial socket on the right side by means of a blunt probe, it was evident that the outer plate of the alveolus had been quite removed by the trephine, and the gum perforated on the labial aspect some distance from the margin. The socket on the left side, however, was complete on all aspects. The time occupied in preparing instruments, taking measurements,

&c., was about ten minutes; the actual time of the second operation—that is, forming the artificial socket and implanting the tooth—was only about six minutes, and the whole clinic in which the two teeth were inserted, even including delays, did not exceed three-quarters of an hour. Dr. Younger lays considerable stress upon the necessity of sterilising all instruments, syringing the mouth and the cavity with a 1°/100 solution of mercuric chloride. I cannot help thinking that too much stress seems to be laid upon the necessity of these antiseptic precautions. In an operation such as this in the cavity of the mouth, strict Listerism is not attainable. I do not depreciate in any way the observance of these precautions being taken; but I think my criticism is justified when the operator, after carefully sterilising his hands, proceeded to dry them on an ordinary towel which had been freely exposed to the atmosphere. The history of the teeth which were implanted in this case was obscure; they certainly had been extracted some time, and therefore had become perfectly dry. Previous to their being placed in the sterilising solution the pulp cavities and canals had already been thoroughly cleansed and filled with Hill's stopping, from an opening on the palatal surface of the teeth. With regard to the effect of the operation upon the patient, I must say he seemed to stand it uncommonly well, and, from my observation of this and other cases I certainly feel that this aspect of the operation should be no great barrier to its being adopted. The tooth when first implanted had a very white, unnatural look; but a decided change was perceptible in quite a short time:—the colour becomes uniform with the other teeth in from two to six weeks. It was indeed extremely interesting to observe how implanted teeth, chosen haphazard so far as colour is concerned, become almost, if not really, indistinguishable from the normal natural teeth.

The following letter from Mr. Gartrell clearly describes these operations from a different point of view—that of the patient:

October 26th, 1887.

DEAR CUNNINGHAM,—In reply to your enquiry *in re* notes on my implantation case, I send you the two teeth used, and I shall be glad if you will have them examined under a microscope, and let me know if there is any pericemental membrane on them or not. They are, as you see, the right and left superior laterals, but whence they came, and to whom they belonged, I cannot say. I believe they were picked out from a lot of extracted teeth at some dentist's in Washington. Nearly

all who spoke to me as to the operation were curious to know the severity as regards pain. My answer has been that it is quite as bad as having a tooth out. After the first incision the detaching of the periosteum, before drilling the hole, is the most painful. The drilling and burring out of the socket is, however, bad enough, and got worse as it neared the end. In my case, however, I think it was worse than usual, as the whole of the outer, or labial, plate of the socket for the right lateral, was cut away; and the instrument finally passed through the gum on the labial surface, which was afterwards held together by a stitch of silk thread. The left lateral had a very thin plate of bone on its labial surface, but the trouble with this tooth was that it was a very thick one, as you can see by looking at it, so that it came in the way of the bite. Dr. Younger tried to correct this by grinding off the cutting edges of the lower laterals, but he did not take off enough to do any good; the consequence was that after five or six days' use the silk ligatures had slackened a little, the teeth got very loose and moved with the least possible force—such as suction in drinking, &c. The right lateral could also with very slight pressure be pushed up into the gum an eighth of an inch too far, the root pressing the gum outwards before it. The left lateral was also being constantly interfered with by the lower teeth; also the hurry sometimes in travelling prevented my taking as much care of them as I might have done at home. In fact, there ought to have been a platinum plate struck up to fit the palatal surfaces of the whole of the front teeth, with the platinum passing up over the cutting edges of the two implanted teeth, so as to protect them and to keep them steadily in their place. I got my cousin, a dentist in Ottawa,* in Canada, to tie the teeth with fresh ligatures, but they got so loose and uncomfortable that I concluded that it was useless to persevere any longer; but I will try the operation again at home when I can get two fresh good teeth and can give proper attention to taking care of them afterwards. In my case Dr. Younger worked very hurriedly, taking about six minutes in inserting the left lateral, reckoning from the first incision to the tooth being placed *in situ*. I felt that I could have stood the pain better if a longer time was taken, but he wished to operate against time and astonish the natives. I think he made a mistake in not leaving a plate of bone on the labial surface of the right socket by drilling the hole more towards the palate. This might perhaps have interfered with the tooth taking its place in the arch properly; in which case I think it would be better to place an artificial tooth upon a natural root at the proper angle. I should have been glad if cocaine had been tried in drilling one of the sockets, so as to note the difference in the pain, but the whole operation was done hurriedly, and proper care was not taken afterwards, which no doubt accounts for its failure.—Yours sincerely,

J. H. GARTRELL.

Dr. Younger also performed other clinics, which I have no doubt will be duly recorded.

* On further enquiry, Mr. Gartrell informed me that the teeth got so loose that he could not get on with them about ten days after insertion, and on the twelfth day his cousin replaced them again, when he kept them in for another day, then the silk ligatures gave out again, whereupon he placed the teeth in the little box in which he sent them to me.

INTERNATIONAL MEDICAL CONGRESS.**SECTION ON DENTAL AND ORAL SURGERY.**

JONATHAN TAFT, M.D., of Cincinnati, O., President.

Secretaries—A. M. DUDLEY, M.D., of Salem, Mass.; F. H. REHWINKEL, M.D., of Chillicothe, O.,

(Concluded from page 466.)

FRIDAY, SEPTEMBER 9TH—FIFTH DAY—*continued.*

Dr. ALTON H. THOMPSON, of Topeka, Kan., read a paper entitled

DOES FUNCTION CONTROL THE EVOLUTION OF STRUCTURE?

Some time since, Dr. C. N. Pierce discussed a subject similar to that at the head of this paper. After noticing the mechanical forces involved in and influencing the evolution of the teeth, he says: "Those cumulative forces are utilised through heredity, and while so potent in tooth-evolution, exert a similar influence in the development and modification of all other structures and organs. All departments of biology recognise the fact that heredity, adaptation, and growth, being of special importance in the evolution of the organic body, must therefore be regarded as especially formative functions. Adaptation to environment might be called the ancestor of function, as function is of organisation. Illustrations of modification of structure in response to function are very numerous, in which it is shown how an organ may be completely changed or a mere rudiment be fully developed by the demand for the performance of a function unknown before."

A century ago Lamarck laid down the following laws concerning the development of organic life, which we, with all our accumulated facts, can change but little. In his second law he said that "The production of a new organ in an animal body results from the supervention of a new want continuing to make itself felt, and a new movement which this want gives birth to and encourages. Third law: The development of organs and their force of action are constantly in ratio to the employment of those organs. Fourth law: All that has been acquired, laid down, or changed in the organisation of the individual, in the course of this life, is commenced by generation and transmitted to new individuals which proceed from those which have undergone those changes." Altered wants lead to altered habits, which result in

the formation of new organs, as well as in modification and growth of those previously existing.

In our study of the subject we will confine our observations to that field in which we, as dental and oral specialists, are most interested, the teeth.

Everything is made for a purpose, and the purpose must precede the thing made for effecting the purpose. Nature plans her work as deliberately as man plans his actions. The means for accomplishing an end are not the cause of execution, but the effect. The organ is the effect, and function is the cause of structure. As food-selection is the cause of the function, so the function of the acquisition and preparation of food is thus the cause of the masticating apparatus.

If function is the cause and support of structure, if an organ develops or atrophies as it is used or disused, if the impulse of active employment dictates the evolution of parts and tissues in succeeding generations, if organs have been suppressed through disuse or remain in various forms as mere rudiments—their function having passed away—then, indeed, must the teeth of man be tending toward final and inevitable suppression.

If in the future of physical education there shall be found a place for education in the accomplishment of masticating food, then, indeed, may the teeth be improved and developed by exercise, as the muscles and lungs are improved and developed.

Owing to the time for adjournment having arrived, no discussion was had on this paper.

The PRESIDENT congratulated the members on the interest they had shown throughout the session, and hoped great good might come from this Congress, both to the profession and their patients.

A vote of thanks was voted to the President (L. S. Davis) for the exertion he put forth in behalf of the Dental Section.

Also a vote of thanks was offered to President J. Taft and the Executive Committee.

AMERICAN DENTAL SOCIETY OF EUROPE.

THE Annual Meeting of this Society was held at the Hotel Zum Reisen, Coblenz, on September 1st, when a very fair proportion of the members were present.

The PRESIDENT (Dr. George, of Frankfort) called upon the several committees for their reports.

In the absence of Dr. Cunningham (of Cambridge), Chairman of the Committee on Dental Education, Dr. ELLIOTT (of London) read a paper from him on the subject. This was published in the October number of DENTAL RECORD, p. 438.

Dr. MILLER (of Berlin) : I think Dr. Cunningham is mistaken in regard to there being any difference between the dental and medical studies in the same department in Germany.

Dr. JENKINS (of Dresden) asked whether the graduates of the Real Schule were the best ?

Dr. PATTEN (of Cologne) : The Real Schule is intended more for the mercantile class, while the Gymnasium is for the professional.

Dr. GEORGE : We continental dentists have suffered a good deal in years past from the wretchedly loose manner in which American degrees have been, until recently, issued, and we, as a body of Americans here, should do something to strengthen the hands of those at home who are striving to elevate the profession.

Dr. FIELD (of London) : I am not very well qualified to discuss the question of dental education, but as one of the first Americans who had anything to do with the English dental colleges, not as a lecturer, but in giving clinics, &c., I must confess the English system shows a decided advantage. The curriculum is thorough, but one great difficulty is in the lack of practical application, so that we in England do not get those results which are so commonly seen in America. In the States they should pass laws that all students should pass through the full term, and we, as Americans, should advocate this. Dr. Cunningham makes the mistake of not advocating sufficiently the practical part.

Dr. MILLER : I have been in the habit of advising dental students to go to America, not necessarily to get their professional education, but to perfect them in mechanical manipulation ; the profession is so free and open there, that the student would have splendid opportunities that he could not have elsewhere. I quite agree with Dr. George that we should take some action to render it impossible for an unqualified person to get the American degree.

Dr. PATTEN : A resolution should be made by this Society against the loose practice of some of the home colleges. Now, whether this looseness is owing to competition or not, I don't know, Some Germans go to the States for three or four months and come

back with some sort of a diploma, and this must be stopped. Dr. Petterman, in a German magazine, has brought together a lot of evidence in this direction, as the opportunities of getting a practical education here have not been very good, so they go to America, easily get their degree, and return.

Dr. ELLIOTT moved and Dr. JENKINS seconded that a Committee be appointed to take the whole matter into consideration, and report when ready. This was carried, and the Committee appointed.

Dr. PATTEN reported on the progress of mechanical work during the past year. There was little that was of value, and but little that was novel. Among the many things we have heard of, bridge work has perhaps had more attention given to it than any other thing, but while we cannot endorse all that is said in its favor, yet doubtless there are a few cases where it will prove of great service. Dr. Bryan (of Basle) has been good enough to bring a large number of models, &c., illustrating his practice in this department. Dr. Kingsley (of Paris) has also brought a Knapp blow-pipe, which will certainly be appreciated. Dr. Crane (of Paris) will also exhibit some of his crown and bridge work.

Dr. JENKINS: I would like to call the attention of the Society to a preparation of gutta-percha for taking impressions. It was introduced to my notice by Dr. Young; it is the ordinary commercial crude article of the rubber shops, and I shall pass around these models, that you may have some idea of what it can do.

Dr. ELLIOTT: I desire to thank Dr. Jenkins for calling attention to this material. If we can in any way obtain the beautiful results as shown by these models, I consider it of great value. Dr. Elliott also spoke of the Schmit press, that for plain work it was good, but for prominent ridges, &c., the model was apt to break under the irregular pressure, a feature done away with in the hydrostatic press, using also a Spence metal model, but a rubber diaphragm for the counter, so that all pressure was even and gradual.

Dr. MILLER, as Chairman of the Pathology Committee, reported as follows:—

It is not my object to enter into a detailed account of the experiments I have been making on this subject, as they are not by any means yet completed.

I have found the difficulties far greater than I anticipated, and instead of accomplishing the task in six or eight months, as I expected to in the beginning, I shall require at least, in all, three or four years.

The object of my experiments, as I stated it at our last meeting, is to determine whether or not the teeth—either during their development or at any subsequent period—may be influenced in their structure or chemical composition by the character of the food given, particularly by an abundance or lack of lime-salt.

This I consider to be a question of great practical and scientific interest, and one which can be settled by experiment alone, individual experience being, for reasons stated a year ago, practically worthless. It is true that the majority of experienced dentists with whom I have spoken on this subject have answered this question in a positive sense, without, however, being able to give any conclusive reasons; others are of a directly opposite opinion, and for no better reasons. I take this opportunity to state that my object is not to give support to either view, but to obtain results, if possible, upon which an opinion may be scientifically based.

I showed in my paper last year—which was nothing more than an introduction to the subject—that, under certain specified conditions, the amount of lime-salts obtained by children with their food is less than what is necessary to properly build up the osseous system. I also made a number of experiments on grown dogs, obtaining results of which I said: "Although on the whole *it might appear* that a change had been produced in the proportion of lime-salts to organic matter in the teeth, yet the number of experiments is too small, and the results too little pronounced, to admit of drawing any definite conclusions." The annotation on the above communication, in the London *Lancet*, as well as the remarks on the same by Messrs. Sewill and Charles Tomes, produced an incorrect impression of the contents of my article; Sewill going even so far as to make a lengthy quotation, which he says is evidently from Miller, which, in fact, however, is not at all from Miller.

During the last twelve months my experiments have been made exclusively on young animals (mice and dogs). Attempts to experiment on cats failed through the premature death of the subject of experiment.

In each series of experiments, the litter of pups, or mice, was separated into two groups, and one group fed normally, the other on artificial milk (containing all the constituents of milk except the lime-salts), sugar, fat and peptones. You will be convinced at once as to the effects of such a regime upon the bones. As you see, the epiphyses are exactly like little sponges, and the shafts can be tied

to knots. As for the teeth, I have been very much surprised to find how very little they seem to have been affected, both as to time of eruption and as to the stage of development of the roots. What the effect may have been upon the chemical composition of the teeth I cannot state, as the analyses have not yet been made, nor do I care to enter into further details until my experiments have been completed. My results so far, I may say, appear to be markedly different from those obtained by Gallippe, who is of the opinion that the teeth are the first to be affected. I found the bones decidedly more altered, at least microscopically and physically, than the teeth.

Dr. Miller also gave a short résumé of the most important paper which had been produced in the course of the year on histological and pathological dental subjects, dwelling at length on the recent communications of Bödecker and Heitzmann (*Independent Practitioner*), relative to the development of the teeth. The views of these authors, as well as the views at present accepted, were illustrated by large drawings made by Dr. C. H. Abbot (of Berlin). Dr. Miller represented Bödecker & Heitzmann as, at present, standing alone in their views, and as being opposed by some of the best dental histologists in America, who have declared themselves unable to see, even in preparations made by Bödecker & Heitzmann, what these authors claim to see, and what Heitzmann has made so plain in his drawings.

Many others histologists are at present testing the views of Bödecker & Heitzmann, and, in a few months, we may hope to hear a conclusive substantiation or refutation of them.

Dr. MILLER: The subject of implantation, as practised by Younger, has perhaps more than any other occupied the minds of the profession, particularly in America, during the last year. You are all, no doubt, familiar with the operation. It consists in drilling or boring holes (sockets) in the alveolar process at points where the natural teeth are missing, and planting or implanting teeth in these artificial alveoli. That teeth implanted in this manner will, as a rule, be retained for a certain length of time, there can be no doubt; how long we are utterly unable to say. Younger uses for the purposes of implanting—not unfrequently—teeth which have been for days, months, or even years, out of the mouth, and believes that the pericementum of such teeth becomes revitalised, so to speak, when they are planted in living tissue. In this, I think, there can be no doubt that Younger is entirely in error. When a tooth has been out of

the mouth so long that the pericementum has become completely dry, there can be little hope of restoring it to life again.

As to the manner in which such teeth are retained in the jaws for a certain time, I have already expressed myself in the *Independent Practitioner* for January, 1887. I have found, by experiments on rabbits, that the pieces of dead dentine may be retained and firmly held in living tissue by encapsulation. Small pieces brought under the skin or into the abdominal cavity *under aseptic* conditions, soon become enclosed and firmly held in a dense capsule of connective tissue, and could not be removed without tearing the tissue. In all cases, however, resorption soon began forming irregular resorption-territories or cavities, into which the tissue grew, thus forming another temporary bond of attachment between the dentine and the surrounding tissue. In one case, where the piece of dentine was left for twenty-four hours in putrid saliva, suppuration took place, and the piece was thrown off.

When pieces of dentine having living pericementum was used, an apparently permanent union with the surrounding tissue was formed, no resorption being evident after three months. I see no physiological reason why the implantation of teeth—where the alveolar process has been sufficiently preserved to enable one to obtain a normally deep socket for the tooth—should not show nearly as large a percentage of successes as transplantation. The operation should always be performed under antiseptic conditions, and, as far as possible, freshly extracted teeth should be made use of.

The PRESIDENT: You know, gentlemen, that Dr. Miller has been put to a good deal of expense in making the experiments he has alluded to, and the Society has felt it a privilege to give some pecuniary aid in the matter. What we have been enabled to do, however, will not begin to reimburse Dr. Miller.

Dr. ELLIOTT: Before asking Dr. Miller his views of the Younger operation, I would mention the fact that some five or six years ago Dr. Finley Thompson, my predecessor in the National Dental College, performed the operation of replanting some 80 times. For a year or so the percentages of success was very good. As Dr. Thompson soon after left the country, I have not been able to obtain any information further; but I cannot see why the *modus operandi* might not be considered more conducive to irritation than the older and less elaborate. You may remember, gentlemen, that Dr. Thompson capped with gold the ends of the roots, and carried a tube from this cap through

the nerve canal to the crown of the tooth. Now, when absorption sets in, the gold cap and tube will be left protruding, and must prove detrimental.

Dr. MILLER : I quite agree with Dr. Elliott, and cannot see what is to be gained by the process.

A series of resolutions on the death of the late Dr. Abbott, of Berlin, were read and unanimously carried.

After the reading of other papers the Society adjourned, to meet at Paris in 1889. The following officers were elected :—Dr. Elliott, President ; Dr. Sachs, Vice-President ; Dr. Patten, Secretary ; Dr. Miller, Microscopist.

BRIGHTON DENTAL SOCIETY.

THE First Meeting of the Society for this Session was held on October 7th, at 21, Old Steine, Mr. J. Wood (President) in the chair. The PRESIDENT delivered the following address :—

Gentlemen,—I have now to thank you for the very great honour you have conferred upon me in electing me your President ; at the same time I cannot hide from myself the fact that there are others in this Society who are far more competent to perform the duties of that office, gentlemen who are much better acquainted with the working of scientific societies than I am, and who would carry out with greater advantage to this Society the duties which will devolve upon me. But as you have been good enough to express your confidence in me by placing me in this distinguished position, I promise to exert to the utmost of my ability all my powers to promote the success of the Society and the well-doing of its members. I am well aware of the great responsibility I undertake, inasmuch as the institution is a new one in this town. The high character it has already attained under the presidency of our friend Mr. Fox has to be maintained, and the full confidence of the profession to be gained ; and to effect this a good work will have to be accomplished—a work that will be elevating and helpful, and calculated to promote good social fellowship amongst its members. I am quite satisfied that I shall have your sympathy and support in my effort to steer our craft to so desirable a haven. I have every reason to believe that there will be plenty of subjects submitted for our consideration and discussion, and that altogether the session promises to be a fruitful one. I believe several gentlemen are busy preparing papers ; indeed, one informed me that he

had one on the stocks ready for launching. I would impress upon you the great importance of introducing casual communications; much practical good often results from a discussion of subjects introduced in this way.

The more active members of the Hospital Staff have an excellent opportunity of collecting matter for short papers on pathological cases such as are rarely met with in private practice. Then, again, models of interesting cases either for regulating treatment or for artificial dentures and the preparation of models for dentures—all of which would highly interest us and result in much profit.

I should like to draw your attention, before closing my brief remarks, to one other subject, one which I am sure is very dear to our hearts, and that is, of the future of our Dental Hospital. I would ask you to take into your serious consideration the best means to adopt whereby we may raise funds for acquiring a more suitable building, for the more comfortable and effectual conducting of the work of the institution, and where we may, with the permission of the managers, conduct the meetings of this Society; it will, therefore, be our interest to do all in our power to help in every way to further the prosperity of the Hospital. I am also very desirous, as I am sure you all are, of seeing a museum and a good library started; but, in our present circumstances, it is impossible to find a fitting place for either one or the other.

Now, gentlemen, I will not detain you with any further remarks, but close by once more offering to you my very sincere thanks for placing me in this proud position.

After the address the company adjourned to dinner, kindly provided by the President.

The usual toasts were drunk, after which a most enjoyable evening was spent. Messrs. J. H. Redman, A. H. Tester, S. Johnson, A. L. Goodby, and others, contributed much to the enjoyment by their excellent singing.

There were present Messrs. C. M. Cunningham, D. J. Caush, O. A. Fox, A. L. Goodby, W. Harrison, S. Johnson, E. L. Norris, J. H. Redman, A. Roberson, W. J. Stephens, C. B. Stoner, A. H. Tester, J. Wood, W. R. Wood, jun., and Charles Wood.

Letters of apology were read from Messrs. E. T. Cooksey, Dr. J. Ewart, S. C. Gibbons, E. Tulke Hart, and E. M. Tod.

NATIONAL DENTAL HOSPITAL STUDENTS' SOCIETY.

ORDINARY Meeting, held October 14th, Mr. HENRI WEISS (President) in the chair.

Mr. Fripp exhibited the model of the upper jaw of a woman in which there was the transposition of the canine and first bicuspid; also that of a singularly well-developed set of teeth showing the cingulum in the incisors to a marked degree. Mr. Humby handed round a dental alloy denture in which vulcanite teeth were attached to the plate, and a fracture repaired by means of a copious supply of tin-solder.

Mr. RUSHTON then read his paper on "The Special Pathology of the Wisdom Tooth," in which the development, eruption, treatment, and those points suggested by the theory of evolution, were exhaustively dealt with. Amongst the numerous specimens brought forward to illustrate the text was an upper tooth which had the root considerably worn down by attrition, its pulp cavity closed by secondary dentine, whilst the crown had remained beneath the gum, its existence only being disclosed on extraction.

An animated discussion followed, in which the President, Messrs. Gaddes, Glassington, Rymill, Spokes and others took part, and, after the usual vote of thanks, the meeting was adjourned until Friday, November 4th, when a paper will be read by Mr. Lancaster, M.R.C.S., L.R.C.P.

ADVICE TO ADVANCED DENTAL STUDENTS.

ON no account do any operation without naming your fee.

Prepare the mouth before doing any operation by scaling and cleaning.

Endeavour to be gentle, but firm.

Remove all decay you can before applying arsenic.

Always get a good separation before filling interstitial cavities.

The acme of dentistry is gold filling.

In treating dead teeth open and remove as much of the septic matter as possible the first visit.

V-shaped wedges are the best for keeping teeth apart during operations.

Every operator should have a lady assistant.

Downright sharp chisels sharp burs and hot air for sensitive dentine.

Enter everything you do into a chart book; it is invaluable for reference.

Never run bad work down, but take it out and put better in.

The rubber dam should always be applied, even to successfully dressing a tooth.

In putting on "Richmond crowns," see that you get your pin as long as possible.

Should you advise a "bar" or "bridge" case, see that everything is favourable, or you'll get into trouble.

Take great care to impress upon patients the necessity of the free use of the tooth brush.

Remember that whatever you do, do it as well as you can.

You may believe "That foil makes a better filling than any other form of gold."

THE DANGERS OF THE DENTIST'S CHAIR.

THE well-stuffed velvet-covered chair, says *The Hospital*, which the dentist provides for the victims of tooth-ache, is meant for a solace, a dum assurance to the sufferer that he will not have to endure one unnecessary pang, or even an avoidable discomfort. Whether the unwilling visitors who occupy the seat are grateful for this considerate attention is somewhat doubtful, and it is certain that they would do their best to avoid it if they suspected that the luxurious head-rest might inflict on them a disease more insidious than tooth-ache, and equally objectionable. Not long ago, the eldest son of a family, where the children are carefully kept, and are not allowed to mingle with playfellows less well looked after than themselves, developed an attack of ringworm. The source of the disease could not be traced, and while it was still a subject of conjecture, the second boy had, for some reason, to consult a dentist. A few days afterwards the ringworm appeared on him, and it was then remembered that a visit to the same operator had preceded the development of the disease on his elder brother. The ringworm had been contracted in both cases by the contact of the child's head with the back of the dentist's chair. Doctors who devote their attention to skin diseases know that such accidents are by no means uncommon; but it is almost certain that dentists themselves are unconscious that their furniture is the means of conveying infection. The danger could easily be avoided

by covering the back of the chair with a small antimacassar, giving each patient a fresh one. The same result could be attained by using a piece of American cloth, which can easily be washed, as a protection for or from the chair ; but as a matter of appearance a white linen antimacassar is decidedly preferable ; and most dentists will be glad to use such a simple precaution, rather than incur a danger which must ultimately injure their practice. No one will return where they have once caught such a disease as ringworm. In this connection it may be mentioned that equal care for their customers' safety is required from hair-dressers, a case of ringworm on the neck having been known to result from the contact of one of those voluminous shroud-like aprons in which they drape their customers. These things should never be used for more than one person without being well washed.

STENOCARPIN.

By WM. H. MITCHELL, D.D.S., Bergen Point, N.J.

THIS drug, but recently introduced into the *materia medica* of dentistry, was first brought to the attention of the writer by Allan W. Seward, M.D., of Bergen Point, N.J., about the first of April of this year.

It was discovered by Dr. Seward in making an analysis of the leaves of the tree known in Louisiana as the Tear Blanket Tree, and had been brought to his attention by M. Goodman, V.S., of Bayou Sara, of that State, who had noticed that a poultice of the leaves, which he had applied to the fetlock of a horse that had been injured, possessed anæsthetic properties. He sent a quantity of the leaves to Dr. Seward, who discovered the alkaloid, which he has christened Stenocarpin, and which has for its formula $C_{20} H_{21} NO_3$.

The Tear Blanket Tree grows along the banks of the rivers and streams of the lower Mississippi Valley, and attains a height of from thirty-five to forty feet, the branches spreading from thirty to thirty-five feet. The bark is smooth, and is covered with bunches of sharp spines that spring from a parent thorn, the bunch being quite flexible, but exceedingly difficult to detach from the tree, from which it grows at a right angle. These thorns often reach six inches in length. The tree bears a bean, which grows in pods from eight to ten inches in length.

Dr. Seward mentions that in his experiments he had found it much superior to cocaine, and suggested that it might be a useful addition to the list of dental medicants.

Since April I have used it as an obtundent of sensitive dentine, and have had remarkable success with it. I made mention of it at the First District Dental Society of New York, at the June meeting, and since that time quite a number of practitioners of dentistry have been using the drug with marked success, wherever its anæsthetic properties were sought in obtunding sensitive dentine, soothing exposed pulps, or removing pulps and small growths from the surface of the mucous membrane of the mouth.

Dr. J. Herbert Claiborne, Jun., of New York, has witnessed wonderful results from its use in Ophthalmic Surgery, and reports the removal, from the forehead of a patient, of a sebaceous tumour of oval form, about one and one-fourth by three-fourths of an inch in size. This was done by saturating absorbent cotton with the two per cent. solution, which was placed over and around the growth. After a period of twenty minutes the sensation of the part had disappeared, and at the end of half an hour the operation was commenced and finished, removing the growth entire without any pain, save at one time when, in the deepest part of the operation, a slight sensation was perceived. A quantity of the solution was immediately applied, and the operation completed. A suture was passed through the wound, and it healed by first intention.

Those who have used the drug state they are highly pleased with its effects, and that there is a long future for it. It is a direct antagonist of morphine and opium, ten drops of the two per cent. solution neutralizing one grain of morphine or six of opium. Hypodermically administered, it is especially useful as an aid in extraction of teeth, when it is not desirable to administer a general anæsthetic.—*Independent Practitioner*.

PROFESSOR MILNE and Mr. Jas. Bisset, of Yokohama, state that animals show signs of alarm as much as thirty seconds before an earthquake. Pheasants scream; frogs suddenly cease croaking; geese, swine, and dogs give the clearest indication of an approaching shock.

EXAMINATION QUESTIONS.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

THE following written questions were given at the Examination held on October 31st.

ANATOMY AND PHYSIOLOGY.

1. Describe the Muciparous Glands lying beneath the front part of the Tongue. Adduce the grounds on which they have been regarded as the seat of Ranula.
2. Describe the hard and soft Palate, the action of their muscles, with the nerve- and blood-supply, and give their bearings upon the Surgery of the Palate.

SURGERY AND PATHOLOGY.

3. Give the causes and treatment of Bleeding from the Gums and Jaws.
4. Give the signs and treatment of a Foreign body impacted in the Rima Glottidis.

DENTAL ANATOMY AND PHYSIOLOGY.

1. Describe the dentition and the rostrum of a Saw-Fish. What light is thrown upon the homologies of teeth in general by the teeth of Sharks and Rays?
2. Describe briefly the growth of the Lower Jaw before and after its union at the symphysis. How has its method of growth been traced?
3. Describe minutely the relations of the Upper to the Lower row of Teeth when closed, and point out the advantages of such an arrangement?

DENTAL SURGERY AND PATHOLOGY.

1. What influences are known to injuriously affect Teeth during their development, and how are they subsequently manifested?
 2. Give the causes of Alveolar Periostitis. Describe its varieties, treatment, and terminations.
 3. What are the difficulties to be encountered in rendering Stoppings water-tight? How are these to be combated in the application of the several filling-materials in ordinary use.
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Editorial.

DENTAL EDUCATION OF FEMALES.

THE recent action of the National Dental Hospital and College in admitting females to the teaching of that Institution has received notices by the general press as varied as they have been widespread. The question is one of some interest to the profession, and a few observations in relation thereto may, at the present time, be opportune.

"Education in its larger sense is," in the words of J. S. Mill, "one of the most inexhaustible of all topics." The higher education of women is one section of that subject, having many and diverse aspects. Certain of those phases may be briefly alluded to. Firstly, there is a sufficient demand for it to justify the supply being existent. If a certain, though small, percentage of women be anxious to acquire advanced knowledge, why should educational institutions governed by men not be made available? If it be true that the brain power of a boy is derived from his mother, ought not those who aspire to maternity, cultivate their powers of mind? especially so, when success in the life of a young man is in favour of him who has the higher cerebral development. Therefore does it seem desirable to educate our women as high as possible, that the nation may benefit thereby.

But this welfare of the community leads to another aspect of the question, and one which is too frequently not recognised, and sadly ignored—an omission common with the parent and with most of those who undertake to direct the education of the young. Excessive study is, directly and indirectly, a cause of physical degeneracy. It upsets the balance of development, undermines that bodily vigour and health upon which the usefulness of a trained intellect so largely depends, and frustrates the attainment of that desideratum, *Mens sana in corpore sano*. Upon females these results are more marked than upon males. "When we remember," writes Herbert Spencer, "that one of Nature's ends, or rather her supreme end, is the welfare of posterity," how pernicious, if not sinful, must be any training

which defeats that end. Looked at from this light, the so-called higher education of women has an important social bearing. Whilst on the one hand we see the desirability of educating our women, we, on the other, must recognise the great evils of high-pressure mental pursuits, and its damaging effects upon the functions of maternity and on offspring.

It may now be asked, Are women mentally and physically capable of pursuing, successfully and without danger to health, the required five years' study of Dentistry? The opinion is unhesitatingly expressed that the exceptional woman only, not even the woman of average ability, would be able to undergo with impunity the necessary curriculum. The amount of education required would appear to exceed the limit beyond which the "higher education" of women, taken as a class, could safely go. If that be so, the number of women who could qualify in this country to practice Dentistry would relatively be small. This conclusion receives support from the number of female Medical students at the Paris and the London school—a very small percentage of the total number of students in each metropolis.

The admission of women to the profession of Medicine is no new departure. It attains in Paris, Zurich, Sweden, Denmark, Italy, the United States and other places. Twenty-five years ago the Society of Apothecaries admitted a lady to its Medical examinations; since then several other Corporations and Universities have opened their doors to women. In 1874-75-76 Amendments to the Medical Act, 1858, had special reference to the admission of women to qualifying examinations, and the Act of 1876 effecting that "The powers of every body entitled under the Medical Act to grant qualifications for registration shall extend to the granting of any qualification for registration granted by such body to all persons without distinction of sex." The Dentists' Act, 1878, does not exclude the registration of women as Dentists. The Royal Commissioners appointed to enquire into the Medical Acts, reported in 1882: "It appears to us only fair and reasonable that women should be admitted to the examinations (of proposed Divisional Boards) on the same terms as men, and should, if successful, be

entitled to registration." In the face of those repeated Acts of the Legislature, of the expressed opinion of its learned advisers, and of the willingness of Medical Authorities to admit both sexes to qualifying examinations,—under these circumstances, for all educational bodies to refuse to teach female students would be tacit hostility to the higher powers. Dental education in the United Kingdom is practically exclusively conducted by the eight special schools; and to conform with the avowed intention of the Legislature and qualifying bodies would be an expression of loyalty and of progress. There are now two of those eight Dental Schools that admit female Dental students:—the National Dental (London), and the Edinburgh School.

Though only a few would probably thus be able to enter the profession, that cannot be any justification in preventing those women from so earning their living. Every woman should have full liberty to do any work she wants to do on equal terms with men. As to whether female Dentists would succeed in practice, that is their look out. With that, as with every commodity, if there is no demand the supply will fall off.

GOSSIP.

THE annual dinner of the past and present students and friends of the National Dental Hospital and College will be held at the Holborn Restaurant, on Friday, November 25th, Charles S. Tomes, Esq., F.R.S., President of the Odontological Society, in the chair.

THE annual dinner of the staff and past and present students of the Dental Hospital of London and their friends will be held on Saturday, the 3rd December, at the Holborn Restaurant, George Gregson, Esq., M.R.C.S., L.D.S.Eng., in the chair.

KRUSS and Nilson are reported to have added twelve new elements to the list of those already known, by working on the lines of Crookes and Boisbrandan. Their researches have been made on the nitrates of the rare earths, one of which, Didymium, has been broken up into nine distinct elements. There is a faint

possibility that these so-called elements may be but isomeric conditions of the original from which they have been fractionated. In other words, they may be but new arrangements of the same atoms which constitute their original.

THE difference between the pearly mist born in the valley, which hides with its magic wove scarf the heads of the mountains and a London fog is so marked, that it becomes a subject of interest to know in what that difference consists. They have a common origin, but while the former rolls up the mountain sides as the temperature rises and melts into thin air, the latter hangs its ugly yellow pall over the houses of our metropolis and refuses to budge, however much warmer the air may become. The investigations of Mr. Aitkin have thrown a light on the subject which reveals a structural difference, which other observers have hinted at, but have never fully appreciated. Water in a finely divided state forms the basis of each; but in the London fog we have finely divided carbon as an adjunct. If steam be admitted to a hollow glass vessel it will form a white cloud or mist until the temperature falls low enough, when the vapour will be condensed and trickle down the sides of the vessel as rain; or if the temperature of the vessel be increased, it will pass out and mingle with the surrounding warmer air. If, however, the vessel be first filled with smoke, and then steam be admitted, the vapour will attach itself to the particles of carbon and form a dense cloud, which a rise in temperature will not dissipate. Indeed, it seems no longer amenable to the usual laws. The attachment of the vapour and the carbon is too strong to be easily sundered, and so we have in miniature the persistent fog which hangs over all great manufacturing centres, where carbon is poured out abundantly from the furnace shafts.

“THE perpetual motion” craze has once more cropped up. This time the visionary hails from Canada. His name unknown. He says he has invented a non-exhaust steam engine, having four cylinders. Two pistons of these are constantly at work, while the other two are so completely balanced after the completion of the stroke that the friction has only to be overcome to restore to the boiler the force which drove them forward.

“The earth hath bubbles as the water hath, and these are of them.”

IN 1828 Sir John Dalzell found on the rocks at St. Abb's Head, upon the coast of Berwick, a fine specimen of the sea anemone—(*Actinia mesembryanthum*, Linn.), commonly known as the Bead-lett from the circle of turquoise-blue beads which adorns the shallow fosse outside the base of the tentacles. This creature passed through various hands and eventually found a home in the Aquarium of the Botanical Gardens of Edinburgh, where it was known as "Granny." The father and mother of an offspring numbering 600, she reached the venerable age of sixty years. During the past month she was attacked with a parasitic disease, which proved fatal.

IT is reported that Edison's phonograph, which was given to the world ten years ago as a scientific toy, is now, in its improved form, a commercial success. So clearly does it reproduce sounds, that voices can be individualized if twenty persons have carried on a conversation, which has been recorded on the sheet, or photograph, as it is called. It is further said that an arrangement is in process of perfectment which will enable printers to set up type directly from the dictation of the phonograph. Touching a lever with the foot will cause five or ten words to be sounded, and repeated if necessary. Musical sounds are said to be reproduced so faithfully that each instrument can be distinctly recognised. If half that is told of this new form of the phonograph be true—

"The tale would cure *deafness*."

DR. PAUL says: "I have exhausted a quantity of leaves of the *Gleditschia*, obtained expressly from America. I do not find that they contain a particle of any alkaloid." So vanishes into nothingness the much-vaunted *Stenocarpine* which was to have displaced cocaine as a local anæsthetic. Like hopein, which was but a mixture of atropine and morphia, *stenocarpine* is a mixture of similar alkaloids combined with trickery; hence it can only be obtained in America in the form of solution.

THERE is a curious old custom that used formerly to be in use on the western coast of Scotland, and no doubt was generally employed along the seaboard as the most simple and ready means of arrangement of bargains by a non-writing population. When a

bargain was made, each party to the transaction got one-half of a bivalve shell, such as mussel, cockle, or oyster, and when the bargain was implemented the half that fitted exactly was delivered up as a receipt. Thus a man who had a box full of unfitted shells might be either a creditor or a debtor, but the box filled with fitted shells represented receipted accounts. This may have been the original derivation of the expression to "shell out."—*Benderloch*.

In 1886 Professor Libreich, of Berlin, introduced to the medical world, under the name of "Lanoline," a new fatty substance obtained from wool, for making ointments. In "Alphita," a medico-botanical glossary from the Bodleian manuscript (Selden), we find: "The cerate ysofum is a juice extracted by boiling from uncleaned wool." This, with the mode of preparation, is mentioned by Dioscorides and Pliny as a fat extracted from the fleeces of sheep.

J. H. ROBINSON, an American electrician, has shown, by a modification of Cowper's writing telegraph, that it is possible to transmit facsimiles of written messages. The resistance coils of Cowper are replaced by thin discs of carbon, which Edison discovered to vary their resistance as the pressure upon them was varied. The result is a beautifully-written message. This system is being worked practically in the United States, but in this fast age it is not fast enough to supplant the one in which four messages can be sent simultaneously by the same wire.

HARES in Alsace are said lately to have been affected with pulmonary tuberculosis, caused by the presence in the lungs of strongylus committatus. The same disease was rife in Thuringia in 1864.

THE question of the existence of the *Satellite of Venus* has, it seems, been set at rest by the investigations of M. Stroobant, who has demonstrated that Venus has no attendant moon, and that the stars χ_3 Orionis and χ_4 Orionis and θ Libræ have been mistaken for a satellite. Of the latter he says, "Not only did this star occupy the precise place indicated for the satellite, but the motion of Venus was such as to produce just the apparent motion ascribed to it."

MR. RICHARD QUAIN, F.R.S., who died on the 15th of September, has bequeathed to University College £60,000.

As a rule, the world is not nearly so ill-natured as certain discontented philosophers pretend. In its lazy, indifferent way it is willing to give honour where honour is due if some one will only tell it, with a sufficient air of authority where honour is due.

FAR more than benefits doth love touch the heart, for to do good to others is but giving something out of what we possess; in loving we give ourselves.—*Juan de Avila*.

GREENERIA fuliginea is the name of a new species of microscopic fungus which has lately made its appearance in North Carolina. It attacks and destroys vines in a few days. It is grouped by M. Sacardo under the class Sphæropsidæ.

THERE are now twenty-eight Dental Schools in the United States. These are located in fifteen States and the District of Columbia.

MR. W. J. PIDGEON, L.D.S., Eng., has been appointed Dental Surgeon to the Bootle Borough Hospital. Mr. Francis J. Lankester, M.R.C.S., L.R.C.P., has been appointed Assistant House Surgeon to the National Dental Hospital.

It is understood that Mr. T. Charters White is preparing a treatise on the mounting of objects for the microscope.

DUALITY of the brain and of the spinal marrow was the subject of a communication to the Academy of Sciences, on the 17th ult., by M. Brown-Séquard. It is shown that anæsthesia, hyperæsthesia, paralysis, and various phases of hypothermia and hyperthermia, due to organic lesions of the cerebro-spinal centre, may be transferred from one side of the body to the other. Contrary to the generally received opinion, each half of the encephalon and of the spinal chord may equally and independently serve for all the functions of the two halves of these nerve centres. The anæsthesia, and analogous affections caused by an organic lesion of the centres, are transferred to the opposite side under the influence of a second lesion of those centres; hence it follows that such manifestations are not necessarily effects of the destruction

of certain nervous elements endowed with certain functions, but may be the results of purely dynamic actions exercised at a distance by the irritation caused by the lesion. In the same way one-half of the encephalon may serve as the seat of the voluntary motions and vaso-motor actions for either half of the body; and so with the spinal chord, at least so far as concerns sensibility and vaso-motor actions.

IN the October number of the *Journal of Microscopy and Natural Science* there is a very useful article on Section Cutting, being part XII. of a series of papers on "The Microscope, and how to use it," by Mr. V. A. Latham.

IN "Notes on Cæcal Appendages of Fresh Water Trout" (*Journal of the National Fish Culture Association*), Mr. Francis Day mentions that among 51 fish which were examined, the number of cæcal appendages averaged 40, being slightly in excess in the females. There was great variation in the number of cæca, and the circumstances point to the probability that the number may be influenced by the local amount of food, the least number of cæca being found in the worst nourished. These appendages are lateral prolongations or involutions of the gut, into which the food does not enter, but all furnish an abundant secretion from their internal mucous surface.

DR. JAMES B. HODGKINS says, in the *Southern Dental Journal*, that there are manufacturers who profess to put on the market amalgams which can be malleted, and which are malleable and may be burnished into position after a partial setting. A moment's reflection, by one capable of grasping the laws of crystallography will enable him to consider that these claims must be founded in error. If anything is certain about the setting of amalgams, it is that they crystalize into hardness; that it is by virtue of this law of crystal making, complex though it may be in the case of the amalgams, that they attain form and consistency. Any interference with this process must interfere with the stability of the mass where disturbed.

THE operation of "Immediate Filling" root canals is receiving considerable attention. Dr. J. G. Harper says (*Western Dental Journal*):—In no case where it has been tried have I any knowledge of any other than the most favorable and satisfactory

results. Peroxide of hydrogen is not always at hand, and is not absolutely necessary. Use instead a solution of bichloride of mercury, 2 grs. to the ounce of water, to wash out the pulp chamber; then dry by washing with alcohol, which evaporates by means of hot air; then fill the roots with liquid gutta-percha, containing iodoform, a drachm to the ounce. This may be modified by introducing iodoform into the root canals, using a solution, a drachm to an ounce of alcohol, which dissolves best a small quantity, necessitating shaking the bottle before using. The alcohol may be driven off by heat, as described before; then fill the roots with gutta-percha, nerve canal points and the pulp chamber with cement, and the remainder of the cavity as you see it. In case there is too much tenderness, defer the permanent filling until the inflammation has subsided.

WOODEN points for filling pulp canals are used as follows by Dr. B. Q. Stevens (*Western Dental Journal*):—I first get the length of my canal with a new barbed broach by slipping it through a piece of rubber dam; then I select a wooden point that will reach the end of the root. This I mark at the same point that I measure with my broach. These I compare, to see that I have made no mistake. Then with scissors clip off about the sixteenth of an inch from the wooden peg. After getting it perfectly dry, I hold over a spirit lamp with a very thin piece of gutta-percha. I wrap while warm close and firm to the peg, letting the point extend beyond the wooden point to a very sharp end. I then get the pulp canal perfectly clean and dry. With a clean piece of cotton wrapped on a broach dipped in pure wood creosote and moisten the walls of my canal. I then take up the wooden peg pointed with gutta-percha, and warm it carefully, "not too warm," but just so it will yield nicely to pressure. I force gently to the mark I have made on the peg; if I am not satisfied it is well done, I draw it out and warm again, the patient generally giving notice when it is home.

WE have received a copy of a letter addressed to the General Medical Council by Mr. H. F. Partridge. As the letter is incorporated in a circular addressed to the public, and deals with personalities, we cannot admit it to the pages of the DENTAL RECORD.

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EXTRACTS FROM LECTURES ON OPERATIVE DENTAL SURGERY

(Delivered at the National Dental College.)

By WILLIAM ST. GEORGE ELLIOTT, M.D., D.D.S.

(Continued from page 437.)

AMONG the many valuable appliances we have to help us in our work, none are perhaps more generally used than the matrix, and of these we have quite a number to choose from. Dr. Jack's are very good, and at times invaluable. Ladmore and Brunton's I like exceedingly. This is made of a piece of flexible steel having a small hole in each end; the strip is passed around the tooth to be operated on, the screw hooks into the two holes, then, by turning the wrench, the matrix can be drawn as tightly around the tooth as may be desired. When speaking of clamps, I quite forgot to mention a device I brought out in 1876, and which is now made by the S. S. White Company. It consists of a combined clamp and forceps; by passing the four prongs of the forceps through the holes in the clamp, the rubber having been stretched over the forcep points, all are introduced into the mouth. As the tooth to be isolated can be seen through the stretched hole in the rubber, the clamp is put into position and the forceps removed, in doing which the rubber is detached and left in place. Sometimes, however, it is desirable to pass the silk over the bow of the clamp and around the tooth, forcing the dam well up. I have found great comfort from the use of this device, but it is not always serviceable. Where the tooth leans forward or backward it is hard to get the clamp on, owing to the rigidity with which it is held. I have spent a good deal of time in devising clamps that would force the rubber below the gums where necessary. For deep cavities between the molars I have had wire prongs attached to the feet, adjustable wires, &c., but for years I have not required anything of the kind, because I now never commence a cavity of that nature

with cohesive gold, and consequently dryness, or, at least, extreme dryness, is not necessary. I force the silk down as far as I can without cutting the gums ; I then fill at least one-third of the cavity with tin and gold, malleting it solidly against the cervical wall, and thus forcing the ligature well up.

One of the most valuable improvements in modern dentistry, in my opinion, is the mallet ; without it, in some form, it is practically impossible to do first-class work. It can be done by hand pressure, but at so great a cost in time and labour that practically it is not done. I have known a few fine operators who preferred the force of the wrist to the blow of a mallet, but I have invariably found that for equally good work hand pressure is not only very fatiguing but it is exceedingly slow. I can show you an operation in my own mouth done some ten years ago ; it is well done by hand pressure, without the engine or mallet, but it took five hours to perform the operation, and I would undertake to do it as well, with modern facilities, in one hour or less. The Snow and Lewis was the earliest form of automatic that came into general use, and it still is more used probably than any other. The principle of about all the automatics is the forcing by pressure on the point, of a weight resisted by a spring, and the efficacy ought to be shown by multiplying the weight into the velocity. All on this principle are capable of doing good work, but I do not like them—the point is so liable to slip, and the blows must be slow. We have, in addition to the mallets mentioned, the pneumatics of Kirby and Rogers. They strike a satisfactory blow ; one that feels as if it were doing good, driving the bit of gold home, but they are too slow—200 blows a minute is possible, but not practicable. Next to the automatics in popularity is the hand mallet, worked by an assistant. Some use a light steel, others a heavy lead, as their fancy dictates ; while, from a scientific point of view, a heavy mallet should be used with soft, compressible material, when the effects of the blow are carried far beyond the point of contact, as in soft foil, tin, gold, &c. ; while, with cohesive work, the force of the blow need not extend much beyond the surface. The electric mallet of Bonwill, introduced about 1870, has a short sharp blow, capable of doing beautiful work—to do which, however, two things are essential, plenty of time and a fairly strong battery. Thorough and fine work is mainly the result of thorough malleting ; thorough because, if the gold is insufficiently malleted, it is deficient in strength and solidity, consequently is not firmly attached to the

tooth and readily breaks away from grooves and retaining points ; fine, because thorough malleting gives a homogenous body of equal solidity. The mistake I at one time made was to give most of my attention to the malleting of the surface, which, on account of the mass of the filling not being solid, was not a good foundation—that is, without a solid foundation you cannot get a solid surface. Now, as solidity is essential, and can only be obtained by malleting, it follows that if the blow is not rapid a proportionately greater time must be taken ; condensation in spots will not answer—the entire surface of the filling must be thoroughly gone over. Throwing out the element of time, it is plain that the result aimed at can be as well done by any of the systems of malleting, or by hand pressure. For ordinary work I think the hand mallet the best ; it is so much faster and vastly more convenient than the automatic, and one has so large a selection of instruments to choose from. For very rapid work self-malleting is perhaps the best, particularly when an assistant is used to feed the gold. The speed attainable is about double that when the assistant uses the mallet. The objection to self-malleting, in addition to the labour, is that both hands of the operator are employed, and he is thus unable to use the left hand for other purposes. The electric I think too slow for large operations. If the filling is started and filled throughout with strips of, say, No. 4, folded four times, the work comes out very solid, but it is a tedious operation ; whereas, by the use of crystal gold or cylinders, with the hand mallet, it can be made equally solid in about half the time. Some years ago four operators in London were arguing this point, and it was decided to settle the mallet question by a practical test. Suitable cavities were prepared in teeth out of the mouth, and were selected by lot by those who were to compete. Each operator was allowed to fill the cavity in his own way, time being taken. The results were given to an expert for examination and report, with the following result :—The self-malleter took 2 hrs. 30 mins., the one with an assistant to mallet took 2 hrs. 45 mins., while the electrics took nearly 5 hrs. The tests were for solidity (special gravity), hardness, uniformity of surface, attachment to the tooth, &c., and the award was made to the one who had an assistant malleter, and took 2 hrs. 45 mins.

I gave up the use of the electric some years ago for the reasons mentioned, as well as the fact that the merits of crystal gold forced

themselves upon me to the exclusion of every other form. Lately, however, I have compromised to this extent, the bulk of the filling I still make with crystal gold, but the surface I frequently cover with heavy No. 40 or No. 4 folded. The reason why I have taken up foil for surface work, instead of crystal, is that it is stronger, more fibrous, and not so readily dislodged from the tooth in portions where it is mainly unsupported by the mass of the filling. In each case I use an engine mallet, that I am very partial to ; it consists of a rotatory cam, not unlike the Power's, only single, but unlike it in every other respect. The points are held by friction, and are as readily removed as those of the electric, while the cam is made to strike two blows to the revolution. So that, with my gas-engine and high speed, I get 6,000 blows a minute. This lays the gold down beautifully, and I have a perfectly uniform power or blow, which cannot be the case where a primary battery is used. I also have made right-angled mallets on a new principle ; they work most satisfactorily.

I have said so much about malleting and solidity because by these your work will mainly be judged. Solid work will not only save the tooth best, but it will hold its polish best. When a filling is pitted and rough, you can take it for granted it is not solid ; whether that particular operation should have been solid or not is a question that involves other considerations.

ON THE COMBINATION OF TIN AND GOLD AS A FILLING MATERIAL FOR THE TEETH.

By W. D. MILLER, M.D., Ph.D., &c., Professor in the Dental Institute of the University of Berlin.

*(Being a series of Lectures delivered in the Institute, and translated from the German by Miss St. George Elliott.)**

GENTLEMEN,—You have all, no doubt, time after time, felt that among the many materials which nowadays are used for stopping teeth not one possesses the qualities of an ideal filling substance. You have, therefore, tried to overcome the difficulty as far as possible by choosing for each separate case that material which has the greatest number of the wished-for qualities, or, to speak more correctly, that material which has the fewest objectionable qualities.

You will also readily acknowledge that in many instances the

* At the request of the author, a number of changes made in the text, also the number of illustrations reduced to fifteen.

question "With what shall I fill this cavity in order to obtain the best result?" is exceedingly difficult to answer and is imperfectly solved by the choice of that material which, in the opinion of the operator, *comes nearest* to what is desired.

Under these circumstances, it is evident that, through the introduction of a new and good filling material, the practical value of dentistry is greatly enhanced.

The material to which I wish to call your attention to-day, a combination of tin and gold, seems to me in many cases to very materially diminish the difficulties of the operation for both patient and operator, and to render possible the introduction of a more permanent filling than could be obtained by other means.

It is now about 25 years since the late Dr. Abbot, of Berlin, first made use of the combination of tin and gold foil as a filling material; but although the Abbot method occasionally found an enthusiastic follower—I mention here only the names of my colleagues Drs. Jenkins, of Dresden, and Sachs, of Breslau—it has only been in the past few years that a general interest in this important topic has been awakened, and this as a result of the many discussions in the different dental societies, and also the communications in the professional journals. This may be accounted for partly by the fact that the superiority of this substance was not well enough known, and partly by the circumstance that many, for fear that there would be an injurious electrical effect, did not dare to insert two different metals in the same cavity. There are still, in fact, at the present day practitioners who have this groundless fear of electrical disturbance. I have even met with cases in which dental practitioners have insisted upon removing such mixed fillings, under the supposition that they would necessarily injure the teeth, notwithstanding the fact that these teeth had, by the use of tin and gold, been kept for years in excellent condition.

For this reason it is thought to be in place, in connection with the tin-gold filling, to point out the electrical processes which may take place in filled teeth in the human mouth. As is well known, Bridgeman, in a prize essay, has endeavoured to trace back to electrical action the origin of dental caries. According to his view, there are electrical currents between the different parts of the teeth, for instance, between enamel and dentine, enamel and cement, dentine and cement, &c., by means of which the mass of the tooth is destroyed in pretty much the same manner, through local currents,

as is a piece of impure zinc in dilute sulphuric acid. A theory of dental caries, so poorly supported by facts of experiment and experience, produced no particular impression. It was different, however, with the theories of Chase and others. They succeeded by means of experiments, which to my knowledge have never been published, in constructing a series in which the difference of potential between the different stopping materials and dentine is shown. This series is as follows :—

Electro-negative.	Gold
Amalgam	Tin
Gutta-percha	Dentine
Oxychloride of zinc	Electro-positive.

Each being E. N. to all that follow, and E. P. to all that precedes.

The result is that the greatest E. M. F. is generated by a combination of gold and dentine ; the combination of amalgam and dentine furnishes a smaller E. M. F. ; a still smaller that of gutta-percha and dentine. Based upon these and other experiments, Chase concluded that a tooth filled with gold would soon show a reappearance of caries upon the edge of the cavity, as a result of the strong current existing in all places where acid fluids in the mouth constantly wash the filling and the neighbouring tooth-substance. A tooth stopped with amalgam is less affected by this electro-chemical process, still less is one filled with tin—the proportions being 100, 67 and 50—while the tooth which is stopped with oxychloride of zinc, becoming electro-negative by contact with this material, remained secure against the action of acids, which are likewise electro-negative.

Chase also succeeded in proving (?) the truth of this reasoning by means of experiments. He procured several pieces of ivory of equal size and the same form, and bored a hole in each piece, filling these cavities with various filling materials. After these had been exposed to the action of an acid for a week, he found they had diminished in weight in the following proportion :—

The piece filled with Gold	-	-	0.06
„ „ Amalgam	-	-	0.04
„ „ Tin	-	-	0.03
„ „ Gutta-percha	-	-	0.01
„ „ Wax	-	-	0.01
„ „ Oxychloride of Zinc	-	-	0.00

Reasoning from these results, Chase came to the conclusion that among all the filling materials in use gold is the worst, and that

every tooth filled with metal is a galvanic battery, which becomes active as soon as the surrounding fluids have an acid reaction. Practitioners of good standing, determined by the experiments of Chase, entirely gave up the use of gold as a filling material. Under such circumstances, it is easy to understand why it was thought unwise to place a mixture of two metals in the same cavity. It was believed, in spite of the non-existence of any satisfactory proof, that, if one metal had such a disastrous effect upon a tooth, a combination of two metals would increase the danger of injuring certainly two-fold, if not in greater ratio. Practical experience teaches us the fallacy of this conclusion, and indeed Chase's experiments and results were of a so surprising a nature that other dentists were immediately incited to repeat the same experiments, and, so erroneous, that the errors were at once made apparent. I, myself, five years ago, began two series of experiments, with the object of finding out:—First, whether an electrical current can exist between dentine and metal; second, whether the rapidity with which dentine is affected when laid in diluted acid is dependent in any wise upon contact with a filling material.

These experiments were made in the laboratory of Du Bois-Reymond, and the results were published partly in the *Deutsche Medizinische Wochenschrift*, and partly in the *Dental Cosmos*, from which I make the following extract:—

“What electrical actions take place when we bring a living tooth into contact with metal? It has been proclaimed that every tooth filled with metal is a galvanic battery, which becomes active as soon as the surrounding fluids have an acid reaction (Chase). This statement does not, however, rest upon any experimental facts. So far is this from being the case that its advocates openly admit that nobody has yet been able to detect this galvanic action, still less to measure the same.

“Regardless of these views, I maintain that there certainly are electrical currents to be found in the mouth when it contains teeth filled with metal. These currents do not, however, exist between the filling and tooth-substance in such a manner that the latter can be compared to one of the plates of a galvanic element; but the electrical processes which really take place in the mouth owe their presence wholly to the heterogeneity of the metallic fillings.

“On the surface of every filling, even of one of pure gold (when, as is always the case in practice, the filling is not throughout of a

uniform density), electrical currents will be generated which flow between the denser and less dense points. But since all of these currents do not tend towards the margin, no injury to the tooth may be feared."

"When two fillings composed of different materials come in contact in the same tooth, or in any neighbouring teeth, there follows a current which is directed through the mouth and fluids of the teeth from the more oxydizable (electro-positive) towards the less oxydizable (electro-negative) metal, and this, working electrolytically upon the fluids of the mouth, may possibly produce deleterious results. Through this, current acids are produced upon the surface of the electro-positive metal which may attack the tooth around the edge of the filling. This action seems, however, almost entirely to cease as soon as the surface of the positive pole becomes oxydized; in short, practice has not yet proved this process in any wise injurious to the teeth.

"Electrical currents also appear in the mouth when metallic clasps surround teeth in which are metallic fillings, or whenever clasps of baser metal are placed on a gold plate. These currents are naturally weak; nevertheless, through them, free acids may be developed on the clasp, and these in course of time may obviously greatly damage the teeth with which they come in contact.

"Electrical currents are therefore found in teeth:

"a.—When a metal plug is not of the same density throughout.

"b.—When two metallic fillings of different materials, or a metallic filling and a metallic clasp, come in contact.

"c.—When a plate is composed of different alloys.

"Another question in this connection concerns the electric conductivity of tooth-substance.

"Now it is true that the ingredients of which dentine is composed are already non-conductors, but, nevertheless, I tested the conductivity (or non-conductivity) of dead dentine by the following experiments. A section of dentine cutting the tubules at right angles, $\frac{3}{100}$ millim. in thickness, was enclosed in a circuit consisting of three Siemen's cells, and the coils of a mirror galvanometer of 16,000 turns and a resistance of 5,000 Siemen's units. When the circuit was closed the mirror did not show the slightest deflection. The piece of dentine was in this experiment inclosed between the ends of two wires 1.9 millim. in diameter under a pressure of 3 gr. per square millimeter.

"This experiment was then varied by placing three similar pieces in the circuit, in such a manner that the surface of contact

between the wires and the tooth-substance would be enlarged three-fold. The deviation still remained nil, showing the resistance to be infinitely great.

"When one pole of an electrical battery of four Siemen's elements is placed on a tooth filled with metal and the other pole on a second filling or on the gum, it is distinctly felt that the circuit is thereby closed. This fact has given rise to the belief that dentine is a conductor; now this, as has been shown, is not true, the apparent conductivity being due to the fluids which are contained in the dentinal fibrils, and the pulp canal. In this manner the porous cylinder of a galvanic element, naturally a non-conductor, is transformed into an excellent conductor, as soon as it becomes saturated with the battery solution; also a silk thread becomes a conductor as soon as it is moistened with a conducting liquid; so, too, a glass tooth whose canaliculi, pulp chamber, &c., are filled with a salt solution would readily transmit an electric current. We cannot on this account, however, consider these substances as conductors, they being notorious non-conductors, nor could they under any circumstances be used as one of the generating plates in an electric cell. Through this infinite resistance of the tooth-bone every possibility of an electric current between tooth-bone and filling is excluded, just as it would be if the basis substance of the tooth were composed of any other non-conductor; for example, glass."

I also repeated Chase's experiments, using pieces of ivory as well as dentine from human teeth and from fish teeth, and filling or bringing these into contact with various stopping materials, finally allowing them to remain for a certain time in a solution of acid. I was convinced, by a series of experiments (*Dental Cosmos*, 1881, page 91), that it makes not the slightest difference in regard to the rapidity of the decrease in weight with what the pieces are filled or whether they are, in fact, filled or not.

It is simply inexplicable how Chase attained his results, particularly how he discovered that a piece of dentine stopped with oxychloride of zinc becomes negative and consequently resists the action of the acid—in other words, is not affected at all by it.

Dry tooth-bone is, like all other dry organic substances, a non-conductor, and opposes as such an infinitely great resistance to the passage of galvanic currents. Living tooth-bone is, it is true, a conductor, but only in so far in that it is saturated with

liquids. Tooth-bone cannot be used as one of the plates (poles) in a galvanic element any more than can a piece of clay; no current can therefore exist between tooth-bone and filling, nor can the affinity of tooth-mass for acids be either heightened or reduced by any filling.

The above applies equally well to a tin-gold plug as to that of any other metal. In the tin and gold filling the two metals are about equally distributed; this state produces on the surface of such a stopping a large number of indefinitely small electrical currents, which bring about a very intimate, and as yet not quite clearly defined, connection between the two metals, but which have no effect (theoretically as well as practically) upon the teeth.

After these introductory remarks, which I have deemed necessary to a right understanding of my discourse, I take pleasure in giving you some directions regarding the preparation of the material and of the cavities in which it is to be inserted.

THE PREPARATION OF MATERIAL AND OF CAVITIES.

When I wish to make a filling of tin and gold, I lay a leaf of No. 4 non-cohesive goldfoil (for this purpose I always use Abbey's) upon a leaf of No. 4 "extra tough" tinfoil. These leaves I cut now into from two to four strips, according to the size of the cavity I wish to fill. For extremely large stoppings I sometimes use an entire leaf. I then twist these strips with the fingers in a loose roll, which I occasionally use whole, but generally divide into pieces of from 4 to 12 mill. in length, as the depth of the cavity requires. It is a mere matter of taste whether the tin or gold is placed on the exterior of the roll; it is not a matter of equal indifference, however, whether the tin or gold rolls are in the form of a solid rope or only a loose roll. The more compact it is, the firmer are the cut pieces and the greater the difficulty in inserting the separate bits. The tin and gold is rolled at first towards the right, until it becomes a moderately firm rope, which is then unrolled towards the left, and becomes a crinkled twist (Fig. 1). Personally, I



FIG. 1.

prefer to have the tin on the outside, because it does not tear as easily as the gold foil. Dr. Jenkins, of Dresden, who has used the material for upwards of twenty years, chooses rather to have the gold on the outside, because, in his opinion, the colour of the finished stop-

ping is, and remains, better, and moreover the cavity is better lighted during the operation by a gold than a tin surface; finally, because gold is less cohesive than tin. He prepares the material by placing an equally heavy piece of tinfoil upon a leaf of non-cohesive gold foil, and pressing both leaves with the "foil crimpers" in such a manner that the gold is on the exterior. I shall not recommend any particular plan in regard to this, as it is quite immaterial whether tin or gold forms the outside of the roll. Instead of rolling the strips together, you may fold them; but, in my opinion, the rolls are softer, more flexible, and easier to work. My father-in-law, the late Dr. Abbot, who introduced this method of filling, always had the material prepared in rolls, and with the tin towards the surface—a practice which I follow and here recommend.

The cavity is prepared in the same way it would be were non-cohesive gold the filling material, but one can secure the retention of tin and gold in cavities where non-cohesive gold, on account of the flatness or unfavourable shape of the cavity, could not be used, much less cohesive gold. Tin-gold is also more easily contoured than non-cohesive gold.

Special retaining points are never required, and, in fact, would be quite useless.

(To be continued.)

ADDRESS TO THE EDINBURGH DENTAL STUDENTS' SOCIETY.

WINTER SESSION, 1887-1888.

By MATTHEW FINLAYSON, L.D.S.Ed., one of the Hon. Presidents.

MR. PRESIDENT AND GENTLEMEN,—On being invited to act as one of your Hon. Presidents, I at once accepted the office, and with the greatest pleasure, holding that it was the duty of any senior to do all in his power to foster and forward that spirit of professional brotherhood which has now happily supplanted the exclusiveness of former times

You are all perhaps aware, although few, if any, of you can be so by experience, of the dense cloud which formerly enveloped individuals in select practice, fostered in many cases by themselves, to confer an air of superiority, and to keep at as great a distance as possible their less fortunate brethren; men whom no one would have willingly asked for information on any mode of working or

course of treatment. I do not for a moment mean to assert that all in their position were of this stamp. Many liberal-minded gentlemen were to be found who had always the kindest feelings towards young aspirants, helping them on in every way to the goal they had in view, and to these gentlemen we are all indebted for their persistent efforts to elevate our calling, which have resulted in the passing of the Dental Act.

Whilst our branch of medicine was a comparatively close one, others were equally so; old-fashioned ideas and modes of working prevailed, and new systems were slowly eliminated and carried into practice, but with all this, or in spite of all this, dental work was done which can scarcely, in my opinion, be rivalled now, and certainly not excelled. More skilful mechanism was demanded of benchmen then, than is generally called for now, and it took longer time to accomplish. Gold work with tube teeth, dental alloy work on the same lines, and bone work, as it was called, in hard or hippopotamus ivory, hand-carved or with inserted natural teeth, were the order of the day. I need hardly remark that work of this sort was very laborious, took much time to accomplish, and had to be gone about in a very careful manner. Many of the best men in practice at the present time, who have passed middle age, have had experience of this, and universally admit that such training, received in their youth, has proved of infinite service to them.

Accuracy of plan and procedure was essential, more particularly in bone work (which, to use a figure, was the vulcanite of those days, being very much used), as the material being rigid and not plastic, as in the case of modelling for vulcanite, if once by mistake diminished beyond the proper quantity, could not be rendered useful without a most unsightly addition. Blocks of expensive ivory, if incautiously treated—and such a thing sometimes happened even in those days—might thus be rendered valueless, and the labour of several days lost by the rash use of the saw or file.

In these last days, if a case is found to be a misfit—a result which should not often occur, if the preliminary “try in” is properly gone about—it is a very easy matter to take it down and do it up again; but then not only was it difficult and laborious work that was entailed by a blunder of this sort, but very considerable expense had to be incurred before another could be made.

You may ask me, why dwell on this, which is almost all gone now. It is to endeavour to prove to you that a training, which was the outcome of this kind of work, was a good one for those lads who purposed following the profession, and was found when they assumed practice to have been of great and permanent benefit. Work nowadays is too easy, and I am afraid that it may induce a careless and slipshod style, which can only lead to deterioration in operations of a more important kind in the mouth itself.

There was no Dental Act in force then, and the choice of our specialty was free to all, whether they were fitted for it or not. Those men who had served an apprenticeship to a surgeon-dentist—so called, if they were of an aspiring nature—at once, or after a few years, began practice on their own account, many of them succeeding to their heart's wish, as the field was not then so fully occupied; men mostly of moderate education, good workmen, and whose knowledge of the oral cavity and its surroundings had been derived from books and from attendance during the gratis hour at their employer's surgery. Some of these men were contented to go on with the amount of professional knowledge thus obtained, while others graduated or went in for the degree of surgeon, or obtained the Dental-Licentiate'ship of the Royal College of Surgeons of England, proving that there has always been in our ranks a demand for the more elevated platform of a properly accredited practitioner. A system of pupilage also prevailed, and was another source from which good and well-bred operators was obtained; but that I merely advert to.

Many operators of this early period did good and lasting work in gold foil and other mediums. The rubber dam has, I think, been the greatest boon of modern times to all who have to perform delicate operations in the mouth requiring the exclusion of moisture, but gold fillings of a period long anterior to the discovery of the rubber dam or dental engine are yet to be seen, second to none of those done by the most skilful operators of more recent times and with the aid of all modern appliances. Do not imagine for a moment that your predecessors not having had advantages such as you all now possess, and which, let me remind you, you are indebted to them for, were less able than you will be for the positions they filled. The longer you live the more you will realise that instead of that being the case, your utmost skill will be called into requisi-

tion to equal their quality of work. Before leaving this part of my paper, I should like to remind you that on two recent occasions on which eminent professors of surgery in our University presided at our Dental Hospital meetings, suggestions were made by them that the full curriculum for surgeon might be carried out with very little extra effort. The suggestion is a weighty one and worthy of your earnest consideration. Only good can result from having our specialty dovetailed as it were in this way into the ranks of the followers of pure surgery.

I did not intend when I first set to work to pen a few notes for you, to touch so fully on the foregoing matters, and crave your indulgence for perhaps wandering away from the proper subject matter of an address to young men just entering the profession, and now will proceed with what I formerly intended to say, viz.: That it is good for every one of you, in addition to a proper knowledge of all the branches of an ordinary practice, to endeavour to excel, by dint of hard study, hard work, and experimental research, in one or more cognate subjects. We have many illustrious examples of this in this country, in Germany, in France, and in America, and our literature is mostly derived from workers of this class.

The profession is now likely to occupy, as time advances, a much higher position both intellectually and socially. This observation goes by the board, as it would be indeed strange if, after all this struggle for an Act, which defines our position, and allies us to all the colleges, and all this education and training, the members of it should rest satisfied to remain in the same anomalous state as formerly. The Medical Council itself, I believe, is deeply concerned in this question, as it naturally desires to see evidence of the propriety of admitting us to the ranks of the medicos.

It is your duty at all times when in harness to do such work as will show that you are men properly trained. Take time to it, study well your case, and do not rush on at railway speed to a finish. I have often seen cases maltreated by over much hurry. I never almost saw harm result from what might be considered undue delay. Cases are inserted with no regard to the character as depicted in the countenance, and the wishes or fancies of patients are too often gratified to the detriment of the science we profess. Be conservative as far as you may be of the natural organs. This I hold to be the golden rule in dentistry. Never acquiesce in the

demands of foolish people who come to you to have good healthy teeth removed, because forsooth they want smaller and whiter ones, but decline to do so—although at the risk of losing them as patients. You certainly by such action will not lose your own self-respect and are sure to retain theirs also—in the long run. Do everything gently and courteously. Avoid the ostentatious display of instruments, and endeavour always to be natural in your manner and without affectation. Personal habits of cleanliness and neatness of apparel are thoroughly essential, and with regard to fees, they should be kept in moderation, for I am afraid that the notion has got abroad that qualified men are too great a luxury for ordinary mortals, and so a firmer footing is given to irregular practitioners.

Your Hon. President, in his excellent address at the commencement of last session, directed your attention to the proper modes of study and to the best way of laying up the outcome of it for future use. His subject I need not also dwell upon, but would remark that you should have your minds well stored with general information and the current matter of the day, and be what is termed well-read men, men of culture, and not merely dental engines. Our profession is one demanding the utmost circumspection of behaviour, and you should aim at a high standard of excellence, both morally, and, let me add, physically. "The progress towards independence is slow, and few there be that find it"—but if economy without parsimony, probity, and propriety of behaviour, with commensurate ability at one's profession is the rule, success is sure to follow. I do not mean to affirm that if a man with all these qualities sets himself on a hill-top or any other out of the way place, that "the wind will blow patients to him," but I mean to say that if ordinary prudence is observed in the selection of a proper and likely sphere of usefulness, the chances are that a fairly remunerative practice will in the course of time ensue.

In this country one is apt to conclude that there are too many in practice for all the wants of the community, and yet how many people do we meet on the public streets or in society in sad want of our services. The day may come when people will be educated to look more to their own teeth and the teeth of their children, and that may provide work for the constantly increasing stream of licentiates, which does not, I am sure, keep up with the

rapid increase of the population. Then the foreign field is open to all young men, and, I may add, young women too, who may qualify, and it behoves them to select "fresh fields and pastures new," where their services will be in demand.

One of our students, now an L.D.S. of Edin., may be mentioned in this connection as an example: Shortly after taking his degree he set out for Belgium, engaged, I understand, for a time with an employer, and afterwards began, or offered to begin, on his own account in Brussels, but to show the difference betwixt the Government of that country and the Government of this, which takes no interest in almost any profession, enquiries were made by the Consul-General in London (through the Vice-Consul at Leith) regarding his character and antecedents, and on satisfactory answers being obtained from official sources in Edinburgh, the Consul-General reported favourably to his Ministry, and our young friend is now established in the country of his adoption, let us hope, to make a good and lucrative practice. I mention this episode to those of you just finished with your studies and qualified, as I do not see why the whole fields and richest soil of other countries should be almost abandoned to our enterprising American cousins.

I have already remarked that it is to the strenuous efforts of our seniors—most of them, I am happy to say, still enjoying life, and the most conspicuous one of them now enjoying his well-earned leisure with honours, after a long life-time spent in the furtherance of our cause—that we are indebted for the passing of the Dental Act. Had it not been for them no Act would have been passed, for our Government is not one that takes matters of that sort into consideration until by repeated assaults of disciplined forces its attention is drawn to their paramount necessity.

I have often been inclined to grumble at the state of matters which still exists, although the Act is supposed to be in full force. We, in Edinburgh, are not so handicapped by advertising men of a certain class as the profession in other and larger cities, so that we personally have less cause to complain, but I think there is a legitimate cause of dissatisfaction amongst young practitioners and students, who have passed, or are endeavouring to pass a very tight gate indeed, because of its non-effect in regulating or suppressing this most objectionable mode of drawing practice.

On full consideration of the whole matter, I have come to the following conclusions:—That the Act will ultimately, and probably in the lifetime of most of you, be of good effect; but from its provisions not having been retrospective, all those who by sinister means got their names put upon the register, although the bulk of them knew little or nothing of dentistry as a science, must die out before the register can be properly purged. The Education Act being universally in force, the populace should be less ignorant of the difference betwixt a qualified man and an unqualified, betwixt gentlemen legitimately following out their profession and wretches professing it for the sordid purpose of trading on the ignorance and cupidity of the people.

It has often occurred to me that the insertion of teeth with brass and other base metal mounts—a specimen of which I lay on the table—should be held criminally actionable as much as the adulteration of any article of food, or the issue of base coin.

It would be, I think, within the province of duty of the British Dental Association to issue a remonstrance to the public, stating why the Act was framed, what it was intended to guard against, and that in irregular practice, such as I have adverted to, the plainest rules of our art are set at defiance, material often being used of a poisonous nature, instead of the precious metals?

But all these matters are no doubt occupying the thoughts of the very best minds in our interest, and nothing will be done, I dare say, but what is best in the matter.

Before concluding, I should like to acknowledge the great pleasure I had in being present at your last dinner and for the musical treat provided by yourselves on that occasion. To urge upon you the cultivation of the finer arts is, I think, unnecessary, as I am aware many of you are skilful draughtsmen also. These are gifts you do well to hold in high esteem, and they may help you to introductions which may prove profitable, but they may bulk too largely in your eyes. You must guard against too much of the social tendency they have, leading to smoking symposiums and that sort of thing. I do not object (being the opposite of straight-laced myself) to a social meeting occasionally, but be on your guard against giving way to late hours, or to over-indulgence of any kind. If any one gives way in that manner there is little hope of his making much headway in his profession. Let truthfulness, honourable fulfilment of engage-

ments, and Christian gentlemanliness of bearing and conduct—which are, I think, *siné quâ nons*—for success in any walk of life, be always maintained—

And the humblest work ye do,
Let it faithful be and true,
And be ye not ashamed of it,
For it will honour you.

W. C. SMITH.

The session just entered upon, will, I hope, be a most successful one. That the papers and accompanying illustrations will be well got up I make no doubt. Discussion will be evoked which will tend to fix the matter better on your memories, and thus great good to all will be the result. I would suggest that, like the Odonto-Chirurgical Society, you should make an addendum to each night's work, of "casual communications," as that very often brings the more modest or diffident men to the front, and may enlist them seriously in the objects of the Society.

I trust that what I have said may not be considered invidious or too officious, and now conclude by wishing those who have passed and those of you who are striving by every effort to pass—God speed.

ANOTHER PROFESSIONAL HOLIDAY.

THE INTERNATIONAL MEDICAL CONGRESS.

By GEORGE CUNNINGHAM,

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Lecturer on Operative Dental Surgery at the National Dental College, &c.

(Continued from page 501.)

DR. LOUIS OTTOFY made an artistic implantation of a right upper incisor. The tooth replaced had been extracted some seven years. The history of the implanted tooth was unknown, but was an ordinary dry extracted tooth. The patient, on being questioned as to the pain of the operation, said it was not much, and would be quite ready to undergo it again. In this case the operator demonstrated the great utility of the Mellotti moldine apparatus, by means of which he quickly struck up a cap of thin gold plate (32 American gauge). This was fixed in the mouth with white cement, and must constitute a valuable adjunct by placing the implanted tooth under the best possible conditions for union.

In some earlier cases that have been reported, the apical end of the canals was closed with gold screws, the ends being smooth, and

neatly polished. Such a proceeding seems to us not only unnecessary, but really detrimental, by causing a possible source of irritation and unnecessary exposure of the cementum; just as in replantation, excising the end of the root seems disadvantageous.

To digress for a moment from the clinics, I spent several days in the genial society of Dr. Younger, in New York, when I had the opportunity of inspecting the results of some of his operations, performed about a year ago. I merely recite one case as being not only typical, but very accessible. There is a man of colour, one of the employées at the "S. S. W." New York Branch, who has a right upper central incisor, implanted on the 5th October, 1886. The tooth replaced had been removed three years and a-half before the operation of implantation. The appearance of the gum and tooth is perfectly normal and natural. The tooth implanted was an old dry tooth, and has given the patient no trouble or bother. The patient is extremely proud of his tooth, but not unnaturally resents somewhat strongly the needless pulling about, which some hundreds of dental examiners have deemed necessary to bestow upon it.

A very interesting application of implantation was made by Dr. Younger, in the case of the wife of a well-known dentist in New York. There was congenital absence of two laterals, which constituted in the mouth of a pretty woman a considerable deformity. The two centrals having been previously brought in apposition, two incisors were implanted with the happiest results from an æsthetic point, and with the most promising prospects from a surgical point of view.

The subsequent inflammation in such cases is usually of the very slightest, apparently causing little uneasiness to the patient.

Dr. Younger has implanted some two hundred teeth with, as far as he knows, some twenty failures. It is a pity, however, that this estimate of 10 per cent. of failures is not based on absolutely reliable statistics.

His experience is that very few patients complain very much of the pain, most of them asserting that it is not more painful than the excavation of a very sensitive cavity.

It may not be uninteresting for you to know that the fee he charges for the operation is one hundred dollars for a bicuspid and one hundred and fifty dollars for an incisor or molar implantation. The larger fee for the incisor is accounted for

not by any extra difficulty of the operation, but because of a greater difficulty of obtaining suitable teeth. The greatest number of implantations he has made in one month has been five, of which four were, I believe, contiguous. This case he describes as being still quite a success, and a course of continual gratification to the patient. His earliest operation, which dates back two years and three-quarters, is still a success.

It must be remembered that Dr. Younger's special contention is that the life of the pericementum is capable of being resuscitated just as "mummy corn" retains its vitality for an indefinite length of time. This alleged analogy is somewhat unfortunate, for amongst botanists the statement as to the vitality of mummy seeds is as discredited as is the statement as to mummy gold fillings amongst dentists. A correspondence in "Nature," vol. 35, 1887, pp. 114, 463, 582, clearly shows that competent botanists do not accept the case of the germination of seeds taken from Egyptian tombs as authentic, and have universally condemned as utterly worthless the evidence given in support of alleged instances of the germination. The fruitful source of error has been the deception at the outset of the credulous experimenter by the Arab. One correspondent points out that the mummy wheat of one well-known traveller grew up in the form of *oats*—a plant not cultivated by the ancient Egyptians, but now grown in the land they inhabited—though this did not shake his faith in the genuine source of his supply.

All the operations which I have described to you have been cases in which he maintains he has availed himself of this vitality, and that in selecting a tooth for implantation he does not care how long it has been extracted provided that the pericementum still invests the root, which he says a little experience always enables one to decide. In the case of the teeth implanted for Mr. Gartrell, which I only examined carefully *after* their removal from the mouth, I must say I could discover no evidence of pericementum. Professor Greenfield and other experts who have examined them support this view. They also agree with me in still refusing to accept Dr. Younger's theory as to the persistence of pericemental life.

As this theory is receiving some considerable acceptance in America, even, we are told, by some whose names are familiar as noted microscopists, it may not be out of place to call attention to

the fact that a belief in this theory is not at all essential to an explanation of the undoubted fact that the dry teeth, as inserted in this operation of implantation, do become perfectly firm in the mouth, and are retained there for a very considerable time. Mitscherlich, in an excellent and exhaustive paper on the "Replantation and Transportation of Teeth," published in Lagenbeck's "Archiv für Chirurgie," Vol. IV., translated into English in Truman's "Archives of Dentistry," Vol. I., p. 169, after describing the results of transplanting dead or rather dried teeth from the corpse into the living subject, records the results of some experiments on animals which satisfactorily explains the mode of retention of such teeth. He took an upper incisor from a dog's skull, and, after extraction of a corresponding tooth, pressed the tooth extracted into its place, fixing it by means of a silver wire passed through a hole in the tooth and the alveolar process. After six weeks the dog was killed, having been given during the last few days three grains of picronitrate of potash; the carotids were immediately injected. The muscles, like the gums, were coloured yellow; neither, however, in the implanted tooth nor in the sound ones was any alteration in colour perceptible. After removal of the silver wire the tooth was quite firmly seated, and could not be moved in the least by the fingers. The gums, as in the remaining teeth, were accurately applied both to the alveolar process, and also to the tooth itself, and nowhere could any alteration be found in it. On longitudinal section the tooth was found everywhere most intimately connected with the surrounding parts, and suppuration showed itself nowhere. Of the periosteum there were only in a few places some small remains discoverable. On the posterior surface of the tooth two small cavities were visible, the larger of which lay more towards the point of the fang, and extended to the pulp cavity; they were filled with a soft substance, and their walls appeared roundish. These appearances were entirely confirmed by microscopical examination, inasmuch as only in a few places, especially in the anterior surface of the tooth, were traces of periosteum to be demonstrated; where this was absent the tooth was eaten away, and its absorption had proceeded in such a manner that a multitude of globular elements appeared on the section, resembling the fragments which we find in ivory pegs which have been bored into bones and retained in them a considerable time. In the two above-mentioned cavities the absorption

had proceeded further and further, and had at last attained its above mentioned extent. The cementum could still be demonstrated in certain places ; it was, however, absorbed in the greatest part of its extent. In the cavities of the tooth substance masses of bone were embedded ; they were applied to the walls of the cavities without any kind of intermediate substance, and so held the tooth with such extraordinary firmness. This osseous deposit, which was directly connected with the alveolar processes, was freely traversed by blood vessels which sometimes extended themselves close up to the tooth substance. It was also so fully developed, that the process had to be looked upon as fully accomplished, and therefore a later exfoliation of the tooth was not to be expected.

There can be no question, however, that no matter what the theories of Dr. Younger are, his success in practice commands our utmost respect for an operation whose introduction was hailed by the profession with a too general chorus of laughter and incredulity. A duration of little over two and a-half years in an operation like this is manifestly too short a period to enable us to come to a definite conclusion in the matter, especially when we remember that the process by which these teeth may fail in time, except, of course, those that have failed within the first few days or weeks, is usually a slow one. We fear that in the course of time a certain number of those temporary successes will, like their near relations, replanted teeth, fail by reason of the slow corroding effect of an absorbent organ. If our fears prove unfounded so much the better for poor humanity.

After a calm and judicious consideration of all the possible drawbacks and casualties likely to attend the operation, I cannot but recommend the operation as a justifiable experiment in certain special cases, possibly giving results which are simply invaluable to the patient. Unprepared, as I am, to accept the new theory of pericemental life, yet fully endorsing all the importance attached to the presence of that membrane, I, for my own part, in performing that operation, would certainly make most strenuous efforts to obtain a freshly extracted tooth for implantation with a live pericementum, if at all possible. Even a good healthy root with a porcelain crown engrafted on it would seem to me better than what must be, after all, but a mere ivory peg, with possibly some dead tissue attached. With the exception of those rare cases where sound, or relatively sound, teeth must be sacrificed

in private practice, the only plausible source of supply for such teeth must be the hospital, which may thus find a new source for usefulness to the community. Another method of increasing the chances of success in this operation would be taking an impression of the root of the tooth to be implanted, and making a metal cast of the root, which would form a convenient "dummy" for the fitting of the socket, and so avoid all unnecessary friction of the pericementum.

As I had prepared a paper on the so-called immediate method of filling root-canals, I was considerably interested in witnessing the illustrative clinic by Dr. Conrad, of St. Louis. As this operation is so fully discussed in that paper, which will be published in the DENTAL RECORD, a further allusion to it is unnecessary, beyond the statement of the fact that several reputable and trustworthy practitioners are employing the method every day in actual practice, with satisfaction alike to themselves and their patients. The *Dental Review*, of Chicago, says:—"Immediate root-filling is the latest craze." I trust the statistics which will appear in my paper will induce the able editors to revise that statement. In America the subject is receiving considerable attention in papers, discussions, and clinics.

Dr. Wassall, of Chicago, gave an interesting demonstration of a method of root-filling which would seem to have much to recommend it, since most of the operators who gave clinics on root canal filling employed some modification of this method. After treatment of the root canals in the usual way, they are dressed with chlor gutta-percha, as our American friends term a solution of gutta-percha in chloroform, and a thin tapering point of pure gold wire used with gutta-percha to fill the root-canal. Dr. Morrison, of St. Louis, also employs gold-wire for the same purpose; as he described it, churning either oxychloride of zinc or chlor gutta-percha into the canal with the wire. One of the most interesting features of his clinic was a series of prepared teeth, showing his method of operating, by which he is able to remove the whole of the contents of the pulp cavity and its canals through a small opening in the crown $\frac{1}{8}$ of an inch in diameter.

Without attempting any detailed account of the numerous gold fillings executed in the various ways and methods with which we are all more or less familiar, one could not help being struck by the increased use of smooth points. Dr. Gerau, of Brooklyn, after

filling the bulk of a large cavity by the Herbst method, restored the contour mainly by the use of glass points. Smooth points were also used by other operators, and altogether there seemed to be a more frequent resort to hand pressure, at least during a part of the operation, than I remember to have prevailed in my former experience of American clinics, some ten years ago. Dr. Shumway, of Plymouth, Mass., who is both an enthusiast for and an expert in the use of ivory points, executed some contour operations with them, which would satisfy the most critical observer. When visiting Dr. Wheeler, in Albany, later on, I saw him do some very rapid execution with a number 15 or 20 foil, which one might almost say he plastered or rubbed on with a flat spatula-shaped bone instrument, followed up by the hand mallet. The resulting contour was also in this case all that could be desired. The electric mallet found numerous adequate exponents, as also did the hand mallet, the pneumatic, and hand pressure. So far as I could learn, the Herbst method was not so generally used, the only other clinic, besides the one already referred to, was one by Dr. Timmé, of Hoboken. Various forms of gold were in demand, but the only real novelty in this connection seemed to be a clinic by Dr. Allen, who operated with Steurer's gold, which is a new form of the "sponge" variety. The combination of tin and gold also found able exponents.

I feel bound to pay a tribute to one of the English contingent, who, unlike the rest, did not confine his attendance at these clinics to the more selfish *role* of a spectator. Mr. W. H. Woodhouse filled a large labio-mesio palatal cavity in a left upper lateral incisor with non-adhesive, finishing with cohesive gold foil. The operation was performed throughout by hand pressure and by reflection in the mouth mirror.

Clinics on the treatment of the pulp, of alveolar abscess, of necrosis, and of the gums, as also the immediate bleaching of pulpless teeth, were all the attractive features.

The insertion of porcelain fronts in labial cavities, gold crowns and bridgework, served to complete a grand series of operations illustrative of the whole range of operative dental surgery, with one exception—and what an exception!—the use of amalgam as a filling material. In the land of the "Corps of the New Departure" was there not even one operator bold enough to show that there are tips and wrinkles as to the best use of this material, which were

worthy of illustration even in so important and so great a series of practical demonstrations as this undoubtedly was.

Models and appliances for regulating were exhibited by Dr. Jackson, of New York, while Dr. Angle, of Minneapolis, explained the application of an ingenious set of regulating appliances of an extremely novel character.

The clinics in mechanical dentistry included demonstrations on continuous gum work, gold plate work, casting aluminium plates, &c. Mr. McLeod, of Edinburgh, exhibited models of cleft palate obturator and nasal support, while Mr. Campbell, of Dundee, exhibited his very successful application of the Hastie water motor to the dental engine.

Dr. Haskell, of Chicago, very wisely preferred to find a patient for his demonstration amongst some of the practitioners present, as being more likely to appreciate the results than the ordinary hospital patient, and he found one in the person of a canny Scot, who now rejoices in the possession of a very charming denture in full continuous gum work. It is worth noting that the specialists in this work ardently maintain the superiority of the large old-fashioned coke furnace over the more recent smaller gas furnace.

One large room on the first floor, where the principal clinics were held, was devoted to microscopy. Dr. Abbott and Dr. Andrews deserve great praise for the way in which this part of the work was conducted. The exhibit of photo-micrographs by Mr. J. H. Mummery formed one of the most tangible contributions of the English contingent to the scientific interest of the meeting. The possible lack of interest of the many in this exhibit was more than compensated for by the enthusiastic admiration of Mr. Mummery's productions by the experts present, so much so that I expect the series has found a permanent resting place on the other side.

There was one other exhibit of a particularly interesting nature which I must not omit to mention. Dr. Parmlly Brown exhibited a set of teeth which bore the well-authenticated history of having belonged to and been worn by George Washington, and also a large collection of various kinds of teeth, human and animal, which formed a part of the dentist's stock for the supply of artificial dentures in the earlier part of this century, as well as other interesting specimens on the mechanical ability of our predecessors. In contrast to these were some specimens of his

specialty, namely, all porcelain crowns and bridgework. His interesting panorama, illustrative of the historical development of dentistry, from the earliest times down to the present day, will, we understand, most likely be deposited in the Museum of the Odontological Society of Great Britain.

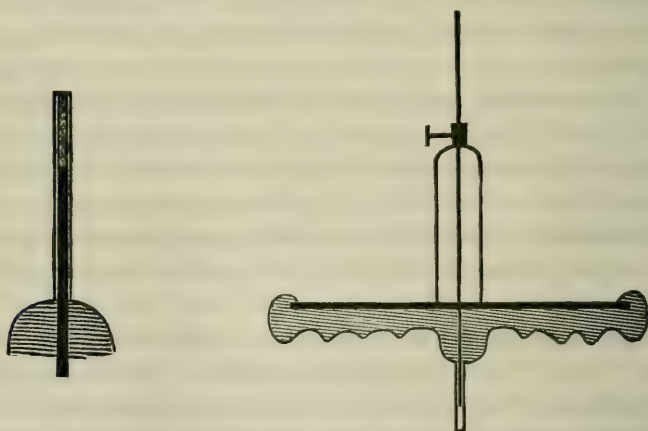
The exhibits of the dental depôts and other dental furnishers were of an exceptionally elaborate and satisfactory nature, and seemed to receive no inconsiderable attention at the hands of the members of the section.

(To be continued.)

AN IMPROVED METHOD OF USING MR. GILBERT WALKER'S PIVOT TRAY.

By WM. M. GABRIEL, M.R.C.S.

It is easy, by the means here described, to obtain a model, having in it a metal tube of the same length as that on the root to be pivoted, and in exactly the same position. Even if a tube is not fixed in the root the advantage will be quite as great: this



being that there is no wearing of the model when taking the pin out and replacing it, and a much greater accuracy in the direction of the pin is thus attainable.

My method of procedure is as follows:—Take the impression in the usual manner, and, after so doing, place over the pin of the

impression tray a platinum tube a little *longer* than the pin exposed.

This tube should be slightly roughened on the outside and then passed down the pin to meet the impression material in the tray. Take next a piece of pivot wire and pass this down the tube to meet the pin of the body, cut off to the length of tube, seal the ends with a little sticking-wax, shellac, &c., and cast the model in the usual manner.

Where many pivots are made, and the models permanently preserved, it may be desirable to have the pin and tubes to be used in this manner made in copper or some other base metal.

THE ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THIS Society held the first Ordinary Meeting of the Session 1887-88, at the Beethoven Rooms, Harley Street, W., the PRESIDENT (Mr. C. S. Tomes, F.R.S.) in the chair.

The LIBRARIAN reported the addition to the library, since the previous meeting, of the last edition of Sir John Tomes's "Dental Surgery," Mr. Bland Sutton's "Introductory to General Pathology," the "Smithsonian Report," and other periodicals.

The CURATOR said that since the last meeting Mr. H. Lloyd Farebrother, of Salisbury, had presented to the Society two different preparations of the upper and lower jaw of an Anglo-Saxon soldier, killed in 527, and dug up from Old Sarum. The jaws were very large, and the teeth very fine and well developed. They had been much used, and the enamel was worn down entirely, leaving nothing but a thin layer of dentine exposed. Mr. Welch, of Brighton, had sent a very small supernumerary right upper wisdom tooth (with models) originally belonging to a lady. The Society had purchased thirteen preparations from the Zoological Society—five being illustrations of the dentition of the monkey; other purchases had also been made.

Mr. HENRI WEISS mentioned a case chiefly remarkable for the absence of 22 out of the usual number of 32 teeth. The only point of interest was, What had become of these teeth? The models were taken from a young lady, aged 22, in whose history there was nothing special beyond an attack of scarlet fever.

Dr. Cunningham and Mr. Hern's papers on "Cocaine," read in

the previous session, and reported in the June number of the DENTAL RECORD, were then discussed.

Mr. J. T. BROWNE-MASON (Exeter) thought Dr. Cunningham's tabulated cases showed an unfortunate experience. He had had only one case of marked toxic effects, out of a prolonged series of recorded cases.

Mr. JAMES STOCKEN described the circumstances in two cases, occurring in his own practice, in which distressing effects were produced by the use of cocaine. In one of these cases, Sir John Garrett was called in, and expressed the opinion "that the injection of cocaine into the system at large is not a desirable operation when only the local effect of cocaine is required." The very various and sometimes conflicting results obtained from the use of cocaine very seriously raised the question in his (Mr. Stocken's) mind as to whether these differing results were not to be traced to impurities in the commercial samples of the drug. He could not come to any other conclusion, and thought it was a subject which demanded careful investigation.

Mr. HENRI WEISS' experience, in from 30 to 40 cases, led him to the conclusion that perfect anæsthesia is produced by injection into the gum; he had had only one unsuccessful case, that of a young lady of highly nervous temperament.

Mr. J. C. STOREY (of Hull) gave the particulars of five cases, which were on the whole successful, and said that a large experience had led him to the conviction that a considerable time on each operation was a necessary condition to success in the use of cocaine.

Mr. C. J. BOYD-WALLIS suggested the use of the alkaloid (in preference to the hydrochlorate) of cocaine, in conjunction with ether, which would act as an antidote. He thought the alkaloid more permanent in its effects than the hydrochlorate.

Mr. D. BROWNING mentioned two cases, in one of which, a case of extraction, 2 mins. of 15 per cent. solution were injected on the buccal surface, and the same on the palatal surface. Complete anæsthesia was produced, and the operation was performed without any pain, but in a few hours afterwards there was the usual slight giddiness. On the road home the patient had considerable trouble, and the next day she had paralysis in the right arm and right leg, so much so that she could not walk across the room; that continued for 48 hours.

Mr. V. COTTRELL said he had recorded 68 cases since the

20th July, and had taken out 114 teeth and stumps ; he had not had one patient who was at all ill. He was strongly of opinion that a large proportion of unsatisfactory cases were due to what might vulgarly be called "funk" on the part of the patient, which a firm and reassuring manner on the part of the operator might overcome.

MR. ASHLEY GIBBINGS (to Mr. Stocken) : Was the solution made at the time of the injection, or previously ?

MR. JAS. STOCKEN : About two days before.

MR. WALTER COFFIN said there was one point he had not heard mentioned—viz., that if the hydrochlorate of cocaine is raised to too high a temperature in water its chemical properties are changed, and is no longer an anæsthetic—in fact, it is no longer the same chemical—but is known by some other name ; but, so long as it is dissolved in merely warm water, there is no decomposition.

DR. CUNNINGHAM said he had several fresh cases he should like to bring before the Society, but, with the President's permission, he would publish them in the "Transactions." Notwithstanding what had been said during the discussion, he was still of his previously expressed opinion that cocaine was unreliable, and nitrous-oxide gas preferable.

MR. HERN corroborated the conclusions he had already expressed in his paper.

A paper was read on

ODONTOMES.

By J. BLAND SUTTON, F.R.C.S.,

Hunterian Professor ; late Erasmus Wilson Lecturer on Pathology, Royal College of Surgeons ; Honorary Member of the Odontological Society of Great Britain.

In the most extended sense an odontome may be defined as a neoplasm composed of dental tissues (enamel, dentine, and cementum), in varying proportions and different degrees of development, arising from tooth-germs, or teeth still in the process of growth.

It is customary to restrict the term, at least from the clinical point of view, to those hard tumours found in the jaws, composed of fully developed enamel, dentine, cementum, or varieties of these tissues. Nevertheless, the careful observations made by several workers during the past few years render a reconsideration of the matter imperative ; for the term should apply not only to solid dental tumours, but to certain cystic forms as well. This extension of the term is of some importance, for we can then include several curious aberrations of tooth-development.

In the higher mammals three distinct parts are concerned in the formation of a tooth :—

1. The enamel organ, derived from the surface epithelium.
2. The dentine papilla.
3. The follicular wall, which, with the surrounding tissue, furnishes the cementum.

It would be obviously convenient if we could base a rigid classification of odontomes upon the embryological history of a tooth. This method, which has been the one mainly adopted since its introduction by Broca in 1869, has not been attended with success.

In the present essay I shall venture to classify odontomes in four groups. The novelty of the method of classification proposed consists in including certain cystic formations and fibrous tumours of the jaws among odontomes. How far this course is justifiable will be seen by the evidence which will be placed before you. The accompanying table represents in a complete form the mode of classification suggested. One of the chief features in this proposed method of arranging these tumours is, that the mode of genesis of the odontome, as well as its structure, is taken into consideration.

CLASSIFICATION OF ODONTOMES.

A. *Aberrations of the Enamel Organ*—

1. Epithelial Odontomes.
2. Calcified Epithelial Odontomes.

B. *Aberrations of the Follicle*—

1. Follicular Cysts.
2. Fibrous Odontomes.
3. Cementomata.

C. *Aberrations of the Papilla*—

1. Radicular Odontomes—
 - a. Dentomata.
 - b. Osteo-dentomata.
 - c. Cementomata.

D. *Aberrations of the whole tooth-germ*— Composite Odontomes.

E. *Anomalous Odontomes.*

A. *Aberrations of the Enamel Organ.*

Epithelial Odontomes.—This name is applied to those tumours

which probably have their origin in aberrations of enamel germs, either of teeth which, normally, should go on to full development, or, as Mr. Eve suggests, from epithelial ingrowths around the dental alveoli, some of which may possibly be regarded as the representatives of teeth long since suppressed in the process of evolution.

To Mr. Eve belongs the credit of drawing attention to the true nature of this kind of odontome, under the name of multilocular cystic epithelial tumour. Details of some thirty cases are now known, from which the following characters have been drawn:—

Most of the patients come under observation at the age of twenty years, although the disease may occur at any period from infancy to old age. More commonly the lower jaw is affected, and the molar region is usually, though not exclusively, involved.

In typical specimens the tumour displays on section a congeries of cysts, in size very various, but they rarely exceed an inch in diameter. The cysts are separated by thin, fibrous septa, in some cases by osseous tissue. The cavities are, as a rule, filled with mucoid fluid of a brownish colour. The growing portions of the tumour are of a reddish-brown colour, not unlike that of a myeloid sarcoma.

Histologically, these tumours are composed of branching and anastomosing rods or columns of epithelium, portions of which form alveoli. The stroma is composed of fibrous tissue; when abundant, embryonic tissue in various stages is present. The cells occupying the alveoli vary; the outlay layer may be columnar, whilst the central cells degenerate and give rise to a reticulum of stellate cells resembling in structure the *stratum intermedium* of the enamel organ.

The naked eye appearance of these tumours is very characteristic. It is usual to find that in many of these cases, as in odontomes generally, absence of one or more of the teeth in the molar region. In the specimen represented, all the teeth in front of the molar were absent. The incisor shown in the figure belonged to the right side. The defect in the number of teeth in these cases supports the views also of Falkson and Bryck, who believe that, in some instances at least, these cysts have their origin in persistent portions of epithelium forming the enamel organ of developing teeth.

Mr. Eve's views concerning the origin of these odontomes

from germs of teeth, or of suppressed teeth, has received considerable support from the observations of Malassez. This investigator has detected spherical, oval, and cylindrical masses of epithelium within the periodontal membrane, and extending from the gum to the apex of the fang of a tooth. The epithelial collections are chiefly distributed below the necks of the teeth, and at the upper part of the root.

It is also satisfactory to find that Mr. Heath believes these views to be confirmed by clinical experience, and he adopts the term multilocular cystic epithelial tumour in preference to the older and very unsatisfactory name of cystic sarcoma. From a clinical, pathological, and evolutionary standpoint, I accept these views unreservedly, and feel that this mode of regarding tumours is a very distinct advance upon the usual narrow lines adopted in the study of human pathological anatomy.

Calcified Epithelial Odontomes.—We must now consider the relation existing between such tumours and the hard odontomes. It has already been mentioned that the septa in these cystic tumours, though usually fibrous, are occasionally composed of bone, and it certainly is easy to perceive that if the mass became in great part ossified we should obtain a hard odontome. On this head, Mr. Charles Tomes has stated that he has observed in at least one specimen of calcified odontome a structure which was such as would be produced by calcification of such tumours. It was for the most part made up of the products of calcification of an infinitely branched enamel organ, there being little trace of dentine or of anything which appeared to have been derived from the calcification of a dentine pulp. A specimen which seems to belong to this form is one figured and described by Wedl.

Before dismissing aberrations of the enamel organ, mention must be made of the following, probably unique, specimen of a single cyst occupying the right side of a jaw, preserved in the Museum of the Royal College of Surgeons. It is thus described by Mr. Eve:—

“It contains no trace of a tooth, and the structure of its wall shows that it is not dentigerous or follicular, in the strict sense of the term, for it is lined by a thick layer of small round-celled epithelium. This may have originated from the expansion of a rudimentary enamel organ owing to the collection of fluid in its interior.”

This cyst is of considerable interest, not only for the ætiological interpretation which may, with good reason, be applied to it, but because it illustrates the destructive effects of a central cystic growth upon the lower jaw. In this case the bony plates forming the angle and ramus of the maxilla are expanded into very thin laminae; the condyle, detached from the ramus, is attached to the summit of the cyst by fibrous tissue; the coronoid process is in a similar condition, and the temporal muscle forms an exceedingly thin investment to the outer part of the cyst wall.

B. *Aberrations of the Follicle.*

1. *Follicular Odontomes.*—The term follicular is here adopted in preference to the older adjective dentigerous, because the latter term has often been applied loosely to any cyst which bears teeth. The result of this inexactness has been to induce confusion, because all cysts which bear teeth are not dentigerous, even when they occur in connection with the jaws; for those curious cysts termed dermoid, and the heterogenous masses, called parasitic foetuses, often contain teeth.

The true dentigerous cyst can only occur in connection with the jaws, and is to be regarded as a distension of the follicle in which the developing tooth is enclosed. If we can agree to apply the term *follicular* to such cysts, misapplication of the word is less likely to ensue.

An extended study of these cysts has led me to some interesting conclusions, for I think it will be possible to show that certain forms of odontomes of the hard variety arise from aberrations of this particular element of a tooth.

The characters of follicular cysts, as is well known, are the following:—

They arise in relation with teeth which have remained within the jaws—retained teeth; they are connected most commonly with those of the permanent set, but may affect also a temporary tooth; this, however, is rare. They are most frequently connected with the molars, and occur in the upper and lower jaws. In the latter situation they expand the bone and produce extensive deformity, leading the surgeon to believe that he has to deal with a solid tumour. In the upper jaw the cyst invades the antrum. In the simplest variety the cyst wall is composed of fibrous tissue, and the cavity is filled with glairy viscid fluid. Projecting into the

cyst in most cases is the fang of an undeveloped tooth ; sometimes, however, the tooth lies in the cavity of the cyst, and in rare instances the crown of the tooth is well formed, but the fang is imperfect.

Follicular cysts are liable to secondary changes ; one of the most frequent is calcification of the cyst wall. All cysts of this nature which I have been able to examine presented this character. The amount of calcareous material varies ; in some instances the wall is a shell of bone.

The best explanation yet offered concerning the ætiology of follicular cysts is that by Tomes, viz., that they arise from excessive formation around a retained tooth, that is between the enamel and the wall of the follicle, of a fluid which is normally found after the complete development of the enamel.

A follicular cyst may suppurate. This event seems to occur most frequently in the lower mammals.

2. *Fibrous Odontomes*.—In a developing tooth a portion of the connective tissue in which it is embedded is found to be denser and more vascular than the rest ; it also presents a fibrillar arrangement. This condensed tissue is known as the tooth-sac, and when fully developed presents an outer firm wall and an inner looser layer of tissue. At the root of the tooth the follicle wall blends with the dentine papilla, and is indistinguishable from it. Before the tooth cuts the gum it is completely enclosed within this capsule.

The tooth-sac attains a large development in ruminants, especially the inner layer, in order to provide the large deposit of cementum for the crown of the tooth in this group. It must, however, be borne in mind that the follicular-sac is not alone responsible for the cementum.

This large development of the tooth-sac in ruminants is of some interest. In 1885 I described before this Society the skull of a goat which presented in each upper and lower jaw a thick-walled cyst developed in relation with a molar tooth. An examination of the wall of these cysts, aided by the microscope, showed it to be made up of lamellæ of fibrous tissue undergoing ossification. In the same paper I was able to describe a second case, also in a goat, and refer to one probably of the same nature recorded by Virchow. Since, an additional specimen has come under my notice, also in a goat.

This year I have had the good fortune to find another specimen in a *Dasyure*, which died in the Zoological Gardens. The skeleton was everywhere softened by rickets, the lower jaw being so flexible that it could be twisted as easily as gutta-percha. On examining the head, each upper jaw was found to be occupied by a tumour of the size of a walnut ; each tumour was distinctly encapsuled, and of a deep flesh-colour on section. It is not a little remarkable that in all cases of this form of odontome, the growths are symmetrical. This case differs from that of the goats inasmuch as the upper jaws alone are affected by the tumours. It is a curious fact, in so far as man is concerned, that in nearly all the recorded cases of odontomes the tumour occupied the lower jaw.

On microscopical examination the tumour was found to consist of lamellæ of dense fibrous tissue, enclosing a central softer portion in which the fangs of a molar tooth projected. In many parts of this dense capsule tracts of bony tissue were found. Near the centre of the mass the fibrous layers became attached to the neck of the tooth and seemed to blend with the periodontal membrane. The central softer part of the tumour contained numerous giant cells and embryonic connective tissue ; in some of the more successful sections a direct continuity of this tissue with the pulp of the teeth was clearly made out.

The chief difference in this specimen and that of the goat previously described, consists in the circumstances that the tumour in the *Dasyure* was far less ossified than in the goat. Possibly the presence of rickets may help to explain the difference,

We must remember that Broca, under the term *odontomes embryoblastiques*, included certain cases of fibrous tumours in the upper and lower jaws, and certainly the specimens from the goats and opossum support this view. I am further convinced that several of the tumours described in Mr. Heath's work on the "Injuries and Diseases of the Jaws" are of this nature.

Other examples may be mentioned, but the above are sufficient to leave little doubt on the mind that a few fibrous tumours of the jaws are in reality odontomes in course of development.

3. *Cementomata*.—In this variety the bulk of the tumour is made up of cementum, often arranged in layers if the tumour be large.

The most typical cases of *cementomata* occur in horses, and may

attain a large size. Their frequent occurrence in the ungalata generally need not surprise us when we remember the abundance of cementum present normally in the teeth of these mammals.

Broca has described specimens of this kind occurring in horses, in connection with the molar teeth, and similar cases have been placed on record by Rosseaux, Goubaux, and Magitôt.

In 1871 Mr. Charles Tomes described in the "Transactions" of this Society an odontome connected with the molar tooth of a horse. The tumour was five or six times larger than the tooth, and weighed ten ounces.

A careful consideration of such cases left a very strong impression on my mind when studied in connection with the tumours described in the jaws of the goats (page 558), namely, that had the goats lived, the soft tumours in their maxillæ would have become completely ossified, and given rise to hard odontomes—in fact, cementomata.

Fortunately, whilst engaged in studying the tumour of the jaw in the Dasyure, and the thick-walled cysts, other specimens came to hand, which have enabled me to raise this view from the domain of probability. These specimens will now be considered in detail.

c. Aberrations of the Papilla.

Radicular Odontomes.—This term is applied to odontomes which arise after the crown of the tooth has been completed and whilst the roots are in the process of formation. As the crown of the tooth, when once formed, is unalterable, it naturally follows that should the root develop an odontome, enamel cannot enter into its composition, which, for the most part, would consist of dentine and osteo-dentine in varying proportions, these two tissues being the result of the activity of the papilla.

When such a tumour consists mainly or entirely of dentine it may be termed a *radicular dentoma*. If osteo-dentine preponderates, then the tumour may be called a *radicular osteo-dentoma*; or if cementum, then it is a *radicular cementoma*. The terms in each instance clearly set forth the source of the tumour as well as indicating the structural characters.

Radicular odontomes, though very rare in man, are comparatively common in mammals, especially rodents, whose teeth grow from persistent pulps. It is impossible to decide the nature of the tissue composing them without seeking aid from the microscope. Examples of each form will now be given :—

1. *Radicular Dentomata*.—As has just been stated, this form of odontome occurs with greatest frequency in rodents, the purest forms occurring in marmots.

It may here be mentioned that odontomes in the lower mammals are by no means most frequent in the lower jaws, as in man. Not uncommonly they are multiple.

2. *Radicular Cementomata*.—Odontomes of this variety differ in no respect in their external characters from those just considered. As is the case with nearly all odontomes, suppuration and necrosis of the bone had taken place. The pus had travelled along the socket of the tooth, which was so large that the teeth moved loosely in the jaw.

On microscopic examination three-fourths of the tumour was found to be composed of cementum. Small patches of dentine were detected here and there throughout the mass, and dark interglobular spaces.

Professor Windle and Mr. Humphreys have recently described from the human subject a specimen which seems to belong to this variety. It occurred in a young man aged twenty-five. The odontome was situated in the lower jaw, on the right side, in the neighbourhood of the second molar tooth. After more than four months' excruciating pain, accompanied with profuse suppuration, life being several times despaired of, the odontome, seven months after its presence was first noticed, became liberated and fell into his mouth. The crown is fairly well formed, the labial surface being perfect, the lingual somewhat tuberculated. The roots are fused into an irregular mass. The under surface is irregular, and is at one point excavated into a hollow.

It is much to be regretted that it is impossible to obtain sections of this interesting tumour. As far as can be judged, the odontome consists of cementum overlaid in places with enamel.

It is far from the purposes of this paper to deal with the effects of odontomes, but the clinical history of the preceding case is very valuable, we read "his life being several times despaired of." In many of the recorded cases a train of severe symptoms, and in some, terrible mutilation from the surgeon, has been the result of these tumours. In one case the operative procedure was followed by death.

In the case of one of the marmots, in the porcupine, and in the agouti, I am convinced that death resulted from the profuse sup-

puration and necrosis set up by the odontomes. When we remember the serious trouble frequently caused by the cutting of a wisdom tooth, we can very well understand the amount of constitutional disturbance likely to be caused by the eruption of a mass, two, three, four or more times the size of such a tooth.

Radicular Osteo-dentomata.—Structurally these are of hard tissue, traversed by canals which contain blood vessels. The dentinal matter may be deposited in a globular form, from the vascular canals; tubules, resembling in their size and mode of ramification those of dentine, pass off and lose themselves indefinitely in the surrounding hard structure.

No odontomes belonging to this group have been described in the human subject, and as far as our present knowledge extends, the only mammal in which they have been described is the elephant.

It is necessary to draw attention to those large masses of osteo-dentine, which occur so frequently in the pulp of elephants' teeth, not only in the tusk, but also in the molars. These masses of secondary or osteo-dentine must not be regarded as odontomes, but as the direct result of inflammation of the pulp.

Small nodules of osteo-dentine are of frequent occurrence in the pulp of healthy human teeth, and excite but little surprise. It is only their bulk which causes wonder, when they occur in the pulp of elephants' teeth.

Similar formations of osteo-dentine occur normally in the teeth of the sperm whale and in the grampus.

D. *Aberrations of the whole Tooth-germ.*

Composite Odontomata.—This is a convenient term to apply to those hard tooth tumours, which bear little or no resemblance in shape to teeth, but occur in the jaws, and consist of a disordered conglomeration of enamel, dentine, and cementum. Such odontomes may be considered as arising from an abnormal growth of all the elements of a tooth-germ—enamel-organ, papilla, and follicle.

Up to the present time I have found no such odontomes in the lower animals, all the recorded cases having occurred in man. A typical odontome of this group is the one described by Mr. Heath, as occurring in the lower jaw of a young lady aged eighteen. The clinical history in this case is very instructive, and the reader

is referred to the original account of it in the Clinical Society's "Transactions," vol. xv.

In the same category may be placed the odontome dislodged by Professor Annandale from the jaw of a young woman aged seventeen, who never had any molar teeth in the left lower jaw. It weighed 300 grains. It consisted of dentine and osteo-dentine, capped by enamel.

Not only is this class of odontomes composite in that the tumours comprised in it originate from all the elements of a tooth-germ, but they are composite in another sense. In the majority of cases the tumour is composed of two or more tooth-germs indiscriminately fused. But they differ from the cementomata containing two or more teeth, from the fact that the various parts of the teeth composing the mass are indistinguishably mixed, whereas the individual teeth implicated in a cementoma can be clearly defined.

E. Anomalous Odontomata.

In this section we must consider a few very remarkable cases. The first was placed on record by Mr. Tellander, of Stockholm ; the details are as follows :—

A female, aged twenty-seven, applied to him in consequence of an attack of inflammation of the right upper jaw, due, as she supposed, to the presence of the roots of a temporary molar. The temporary teeth, so far as was known, presented nothing unusual, and were shed and replaced by the permanent set, except that on the right side of the upper jaw, the first molar, the two bicuspid, and canine failed to appear. The spot where these teeth should have been became at the age of twelve the seat of hard painless enlargement. When the patient applied to Mr. Tellander there was a free discharge of pus from this spot ; some stumps were removed, and carious bone detected. Subsequent examination showed that enclosed within this carious bone was a cluster of minute teeth. There were nine single teeth, each one perfect in itself, having a conical root with a conical crown tipped with enamel ; also six masses built up of adherent single teeth. The denticles presented the usual characters of supernumerary teeth. About a year afterwards a tooth was found making its appearance in the spot from which the host of teeth was removed.

A similar case has been recorded by Sir John Tomes.

A third example of this remarkable condition has been recorded

by Professor Windle and Mr. Humphreys, in the "Journal of Anat. and Physiology," vol. xxi. The case occurred in the practice of Mr. Sims, at the Dental Hospital, Birmingham. The tumour was found in the mouth of a boy aged ten years. It was found that neither the deciduous nor permanent right lateral incisor or canine had erupted. The space thus unoccupied was filled by a tumour with dense unyielding walls which occasioned no discomfort. On opening this cyst forty small denticles of curious and irregular forms were removed from the interior.

Mr. Heath records briefly a case of a similar nature in a boy, aged four years.

GENERAL MEDICAL COUNCIL.

THE General Medical Council commenced its forty-third session on the 22nd of November, the President, Prof. MARSHALL, F.R.S., in the chair.

In connection with the Dental business there was the question of the removal of the name of Mr. H. F. Partridge from the *Dentists' Register*; and the following communications were read from the Royal College of Surgeons in Ireland, and the British Dental Association:—

"Royal College of Surgeons in Ireland,

"Dublin, *November 12, 1887.*

"DEAR SIR,—I am directed by the President and Council of this College to submit for the consideration of the General Medical Council the conduct of Mr. H. F. Partridge, a former Licentiate in Dentistry of this College, who, having entered into a written undertaking, before his admission to examination for the Licence, 'not to seek to attract business by advertising or by any other practice considered by the College to be unbecoming, persistently violated that undertaking, notwithstanding his being called upon by the College to desist therefrom. I am to remind you that, by reason of this violation of his undertaking, and of the Ordinance of the Council referring thereto, the College withdrew his Diploma and required him to surrender same, and notified their having done so to the General Medical Council, notwithstanding which he has since continued to append to his name the letters indicating that he is a Licentiate in Dentistry of the College.

"I am directed to submit these facts—of which I am prepared to submit the necessary proofs for information of your Council—for their consideration, and to request that they will, under authority of Clause 13 of the 'Dentists' Act'—proceed to 'cause enquiry to be made' whether the said H. F. Partridge has been 'guilty of any infamous or disgraceful conduct in a professional respect,' and—if they shall be of opinion that he is so guilty—will 'cause his name to be erased from the *Register*' as therein printed.

"I am, Sir, yours very truly,

"ARCHIBALD H. JACOB, F.R.C.S.I.,

"*Secretary of the Council.*

"W. J. C. MILLER, Esq.,

"REGISTRAR of the GENERAL MEDICAL COUNCIL."

From the British Dental Association :—

“ 40, Leicester Square,

“ London, W.C.,

“ November 21, 1887.

“ I am requested by the Business Committee of the British Dental Association to express to you their earnest hope that the Medical Council may see their way to the removal of Mr. Partridge from the *Dentists' Register*.

“ Whilst they do not presume to offer any suggestion as to the course to be adopted by the Council, for that is a matter which must rest entirely in their own hands, and although they would greatly regret that the Council should enter upon any litigation of doubtful issue ; on the other hand, they feel that the removal of the name, if possible, would be in accord with the spirit of the ‘ Dentists’ Act.’

“ After careful enquiry, the Committee are of opinion that Mr. Partridge is not deserving of the smallest consideration beyond his legal rights, and they would further venture to call your attention to the following circular in which he foreshadows the method in which he will endeavour to render nugatory the previous action of the Irish College and of the Medical Council, and at the same time indicates the manner in which his practice is to be conducted and maintained.

“ I remain, gentlemen, your obedient servant,

“ MORTON SMALE, M.R.C.S., L.D.S.,

“ Hon. Sec. B.D.A.

“ To the GENERAL MEDICAL COUNCIL.”

It was moved by Sir William Turner, seconded by Mr. Macnamara, and agreed to, that the case of Henry Francis Partridge be referred to the Dental Committee for inquiry and report.

The Dental Committee, consisting of the President, Sir Dyce Duckworth, Dr. Quain, Sir William Turner, and Dr. Aquila Smith, having ascertained the facts relating to the case, report as follows :—

The name of Henry Francis Partridge, with the qualification of Lic. Den. Surg. R. Coll. Surg. Irel., 1878, was placed on the *Dentists' Register* on December 20, 1878.

He did not claim registration, on account of his having been in practice before the passing of the Dentists' Act, and cannot now be registered as having been in practice at the passing of that Act.

On July 2, 1885, the Royal College of Surgeons in Ireland withdrew or cancelled the diploma granted by them to Partridge, and a letter dated July 4, 1885, notifying that fact, was addressed by the Secretary of the Council of the Royal College of Surgeons in Ireland to the Registrar of the General Medical Council, and at a meeting of the Executive Committee on July 10, 1885, it was resolved that the Registrar be directed to make application to the Royal College of Surgeons in Ireland for information as to the cause of withdrawal of the diploma.

The President and Council of the Royal College of Surgeons in Ireland withdrew or cancelled the diploma of Mr. Partridge because of his having, in violation of his undertaking given to that College, attracted business by advertising in connection with the Ladies' Dental Institution, South Kensington.

At a meeting of the General Medical Council, held on June 2, 1886, it was decided as follows :—

That the qualification of H. F. Partridge be erased from the *Dentists' Register* ;

That the name of the said H. F. Partridge be also erased from the *Dentists' Register*.

The ordinances of the Royal College of Surgeons in Ireland forbid advertising, and Mr. Partridge, both before his admission to examination for his diploma in Dental Surgery, and again after passing his examination, and before he obtained his diploma, signed a declaration that so long as he held such diploma he would not attract business by advertising or any other practice considered unbecoming by the College, and agreed that his diploma should be cancelled on its being proven that he had done so.

Mr. Partridge has broken such pledge by advertising whilst he was still holding the said diploma, and he did so after repeated warnings from the College. And, further, in answer to the first of such warnings, he apologised, and stated that he was willing to comply with the laws of the College.

On June 15, 1887, the High Court of Justice, at the instance of Mr. Partridge, granted a *mandamus* to the General Medical Council to restore his name to the *Register of Dentists*.

On August 1, 1887, on appeal by the General Medical Council, such decision was confirmed, and the *mandamus* directed to issue.

The name and qualification of Mr. Partridge have been restored to the *Dentists' Register* pursuant to such *mandamus*.

Mr. Partridge still continues to advertise.

Mr. Henry Francis Partridge (registered as Lic. Den. Surg. R. Coll. Surg. Irel. 1878) was summoned to appear before the Council at two o'clock p.m., but although called, he did not appear in person, or by any representative.

Mr. Farrer, Solicitor to the Council, attended, and Mr. Muir Mackenzie was also present as legal assessor, to advise the Council in regard to this case. Mr. Farrer read the foregoing report as to

the facts of the case which had been drawn up by the Dental Committee.

The Council having deliberated *in camera*, it was resolved :—

"That, in the opinion of the Council, Mr. Henry Francis Partridge has committed the offence charged against him, that is to say, of wilfully violating the declaration made and subscribed by him, whereby he declared that as long as he held the diploma in Dental Surgery of the Royal College of Surgeons of Ireland, he would not attract business by advertising or any other unbecoming practice ;

"That the offence is, in the opinion of the Council, disgraceful conduct in a professional respect ;

"That the Registrar be hereby directed to erase the name of Henry Francis Partridge from the *Dentists' Register*."

The session terminated on the 26th ult.

NATIONAL DENTAL HOSPITAL AND COLLEGE.

ANNUAL DINNER.

THE annual dinner of the Past and Present Students and friends of the National Dental Hospital and College was held at the Holborn Restaurant, on the 25th ultimo ; Mr. C. S. TOMES, F.R.S., in the chair. There were about 80 gentlemen present.

The toast of "The Queen and Royal Family" having been duly honoured,

Dr. MAUGHAN proposed "The Dental Societies." He said that wherever there was work to be done there must be organisation, and upon the development of the organisation, or the perfectness of it, depended the quality and the value of the work done. Their dental societies were well organised, and the work they were doing was a good one. The Odontological Society, founded in 1856, stood as the oldest of the societies, and had always held its place among the learned societies of the United Kingdom. They had been singularly fortunate that evening in securing for their Chairman the President of the present year. The object of the Odontological Society was, to a large extent, scientific ; all honour to it, and might it long prosper. The Odonto-Chirurgical Society of Edinburgh, founded a few years later, he believed in 1868, also held a very high position, and its objects were also, to a great extent, scientific ; its *Transactions* had always possessed the sterling merit of which Scotchmen always took to themselves wherever they went. The other society he had to refer to was the British Dental Association. It was a society which had a wonderful vitality. It pushed its arms and legs in every direction, and it was their political representative. It had difficult duties to fulfil, but it discharged them well. Then, in addition to these, there were other societies throughout the kingdom. He might specially point to Manchester, Sheffield, Birmingham,

and Brighton ; and these, he took it, were doing good work. These local societies were a sign of the times. They helped us to see and realise the wonderful development of the art and science of Dental Surgery, which had taken place during the latter half of the 19th century. These several Societies showed once for all to any sceptic that they were united in one thing, viz., to enlarge the scope of their intellect. In the study of sociology, they all knew that society based upon instinct was non-progressive ; but based upon intellect it was progressive. Such, he took it, were the advantages of the well organised Societies whose toast he proposed. One of the objects of bringing members together was for debate, and he believed that one of the most important aids to the development of the intellect, in Dental Surgery, as well as in other branches of science and art, was debate. Certainly their Societies showed enough development in that direction ; and the surgery of the future would bear the impress of that influence, and would be totally distinct from the surgery of the past. The meetings that these Dental Societies arranged also strengthened the social intercourse of the members, which again was most important, and to which he attributed in a large measure the steady disappearance of rivalry and petty jealousy, which had, unfortunately, not been altogether absent in the past. He begged to give them the toast of "The Dental Societies," coupled with the names of Mr. Felix Weiss, Mr. David Hepburn, and Mr. J. Smith Turner.

Mr. FELIX WEISS, who was very cordially received, said he thanked them for having associated his name with the toast of the Dental Societies, and he also thanked them for that kind personal recognition which they had on many occasions accorded him. Dr. Maughan had referred to their three principal dental Societies ; if they would permit him, he would confine himself to the first—the Odontological Society. It was a Society which had grown into and become a recognised Society. He had had some little opportunity of being behind the scenes, for he was a fifteen-years' "scene shifter." The Council had always evinced the greatest interest in keeping the Society up to that standard of excellence which was indicated in their literature. Speaking before a number of students—he was not going to lecture—he would only ask them to try and do two things : first, he would beg of them to become members of the British Dental Association, which was the backbone of the profession ; secondly, he thought as time went on they would find it greatly to their advantage to become members of the Odontological Society. As a veteran, he would say they would advance their own interests. He would ask them to do more, not to be contented until they saw their names as authors of a paper, or if they could not do that, let them take part in their discussions, or bring forward a "casual communication ;" let them do some little, as far as it lay in their power, to advance their dental science.

Mr. DAVID HEPBURN, in responding for the Odonto-Chirurgical Society, said :—He found himself most unexpectedly called upon to return thanks for the kind manner in which the toast had been received. He thought, perhaps, one reason for his being

selected was that there were very few members of the Odontochirurgical Society of Scotland present, and that pointed a moral that those on this side of the border should try and link themselves with their brothers on the other side as much as possible. He thought the Society in whose behalf he was speaking played its part in Scotland in a most excellent way. Its success lay in the fact that it had modelled itself as far as it could on its great parent, the Odontological Society of Great Britain; that it had established itself as a scientific Society, and took as little part in political warfare as possible, thus reserving for itself a scientific position it held its own and flourished. When they found two countries so near, and yet so far apart, containing two Societies with similar objects, yet not inimical to each other, mutually supporting scientific progress, there was that opportunity for friendly rivalry which was productive of good and conducive to advancement. He knew that all its members would be glad to learn that that toast had been so heartily received, and on behalf of the Society he begged to thank them.

Mr. J. SMITH TURNER said he felt it, indeed, a great honour to rise to respond to the toast of the British Dental Association on that occasion. He had been gratified by the way in which the gentleman who had so ably proposed the toast had described it. He regarded the Society as a unique Society, and the first of its kind established either here or elsewhere. It was not established without a considerable amount of experience, because they adopted for their model the British Medical Association. That Association had prospered wonderfully during the last 20 years, and they hoped that their Society would also prosper in the same way. Their Association was governed by a Representative Board, the Representative Board elected a Business Committee, and the Business Committee transacted all the business of the Association between the Meetings of the Board. Sometimes the Committee had been blamed for not doing enough, sometimes it had been blamed for doing too much; for his own part he thought they should console themselves with the words of a Book none studied too much,

“Woe be unto you when all men speak well of you.”

As some thought that they did too much, and some that they did too little, they might fairly and justly conclude that they hit the happy medium, and just did enough. The Association did not want to be continually walking in procession and proclaiming its merits; it worked quietly but none the less effectively. He might tell them that the name of Mr. Partridge, who had already attracted some attention, was no longer to be found in the *Dental Register*, for his name had, by the efforts of the British Dental Association, been that day erased from the *Register*. The Representative Board was composed of representatives from the provinces and members residing in London, and the number of the provincial members was in excess of the London members by 9 or 10. That he thought a very good majority, and he mentioned it to show and to enforce upon them that the Association was essentially a provincial Association. Only twice in the course of 10

years had the President been a London man. The branches were—the Midland, Central, Western Counties, Eastern Counties, and the Southern Counties; the West of Scotland, the East of Scotland; and Ireland; so they would see they had branches all over the country. Well, it was those branches and their office bearers who kept the object of the Association before the public: the London men had little to do with it except the drudgery. At their annual meetings it was the provincial men who were the prominent figures; the London men were not heard of except when the Treasurer or Secretary presented his report; therefore it was essentially a provincial Association, and he would urge them that they ought to join it if for nothing else but to keep up the touch between London and provincial men. The Representative Board had three officers who must necessarily, they thought, reside in London. There was a fourth who did not necessarily reside in London; but at their last meeting they had by a large majority elected a gentleman, a London man, elected, not because he was a London man, but because he was an honour to their Association, a gentleman who was a dental reformer before dental reform was thought of—he meant Mr. Felix Weiss. He had known him now for thirty years, and he had always known him actively on the alert in the interests of the profession; if not finding fault he was doing something else equally useful, and he thought the Association did well to elect him for a term of three years as their Vice-President. Concluding by cordially endorsing Mr. Weiss's recommendation to them to become members of the Association, he begged to thank them for the manner in which they had received the toast.

Mr. J. E. SPENCER, M.P., proposed the toast of the "Staff," and in doing so said:—He took it that the success of a hospital depended upon its staff, for although a staff might exist without a hospital, a hospital could not exist without a staff. He supposed it was something analogous to the crew of a boat; it was not the boat that had the propelling power, it was the keen eye and firm hand of the helmsman and the ready and willing help of the crew that carried the vessel successfully and safely over its course. So with the hospital, with the *esprit de corps* of its students, and the assistance of its able staff, "with a long pull and a strong pull, and a pull altogether," success was sure. He had read with pleasure Dr. Cunningham's paper on "Dental Surgery in Relation to the State" and he had taken an active interest in the subject; Dr. Cunningham had been very busy in the lobby of the House trying to enlist the sympathy and support of Members. He thought it a subject of very great importance, because the health and strength of the Army and Navy very much depended on the teeth. In conclusion, he had much pleasure in asking them heartily to drink to the toast, coupled with the name of Dr. Cunningham.

Dr. G. CUNNINGHAM, in responding, said he had to thank them very much for the kind way in which the toast had been received. He had also to acknowledge the kind and able manner in which the toast had been proposed—a task all the more difficult to one outside

the profession. But, as a profession, they must appeal to outsiders in bringing about necessary reforms, and he knew Mr. Spencer would be willing to give them his help; indeed, it was no breach of confidence to say that he had helped him (Dr. Cunningham) in opening up channels that would otherwise have been closed to him. Speaking of the staff, there was no need to trumpet its praises in such an assembly. Referring to the post he occupied as lecturer on Operative Dental Surgery, he conceived it to be his duty to endeavour to make the lectures suitable not only for advanced students, but for young members of the profession, and he could assure them that it was with no small satisfaction, on the occasion of his first lecture, that he noticed the presence of a leading London practitioner. Such a student as that must stimulate the lecturer to do better things than he otherwise would do. He hoped that the profession, and the students more especially, would not forget that their future status largely depended upon themselves.

Mr. JAMES STOCKEN, in proposing "The Medical and Dental Schools," compared the position and advantages of the present students with those of his own student-days—twenty or thirty years previously—specially comparing the meagre dental literature of the past with the redundancy of the present—a deluge which it was difficult for a busy man to wrestle with. He also referred to the spirit of fraternity which happily now existed, but was unknown in his early days. Having briefly touched upon the subject of the admission of ladies as students at the National Dental Hospital, a subject which he thought it was not in place to discuss upon that occasion further than to say that he believed the spirit which prompted the action which the hospital had taken was a spirit of extreme liberality. He concluded by proposing the toast of the Medical and Dental Schools, coupled with the names of Dr. Norton and Mr. Arthur Underwood.

Dr. NORTON briefly responded on behalf of the medical schools.

Mr. ARTHUR UNDERWOOD, in replying for the Dental Schools, referred to his dual capacity as a Lecturer at the Dental Hospital of London, and Editor of the *Journal of the British Dental Association*. In the latter capacity he felt somewhat guilty whilst listening to Mr. Stocken's remarks, and he feared he should have great difficulty in escaping their condemnation of the part he had taken, and was taking, in contributing to "the deluge"; he hoped, however, he might plead that if the quantity had increased so had the quality. Referring to the Dental Schools, he thought the most interesting feature to be noticed during the time he had been acquainted with them, was the rapid growth in the demands upon them. He touched upon the examinations, and said the practitioner now was a very different being from the practitioner of former days; the examinations, too, were very different. He thought the present L.D.S. Eng. examination as severe a test of capability as that of any of the other professions, and he regarded the Dentist, who held the L.D.S. diploma, as a thoroughly capable man. The flooding the country with qualified men, however, would be an awkward matter but for one thing, and that was the growth of public opinion. The public were now beginning to distinguish between the sheep and the goats; it was

in this way, and not by the enforcement of Acts of Parliament he thought that quackery would die a natural death. These schools would show the public who the right men were, and they would not require any legislation to protect them. He heartily thanked them for the reception they had given to the toast of the Dental Schools.

The CHAIRMAN, whose rising was the signal for a burst of cheering, in proposing the toast of the evening, "The Past and Present Students," said, there is only one thing, gentlemen, which makes the task of a Chairman easy on these occasions, and that is the toasts which are allotted to Chairmen are usually received with cordiality and need but few words to recommend them. I suppose it falls to the lot of most people placed in a similar position to that which I am now occupying to think over a little what they are going to say beforehand, and possibly my own experience to-night is no uncommon one, that the ground has been very much cut from under me by previous speakers; some things that I had intended to say have been already well said, and some others have been vetoed as not fit for a place in an after dinner speech, such for instance as the admission of ladies as dental students, a subject to which I might have alluded but for Mr. Stocken's prohibition. In these circumstances I must try and take my text from what has been said rather than what I had intended to say. I suppose these gatherings play as important a part as those more formal meetings of the Odontological and Odonto-Chirurgical Societies. It is a great thing to meet together for purely social objects, for when anyone has an axe to grind, when one has a feeling of sorness against, it may be a brother practitioner, nothing so tends to remove professional jealousy as a good dinner. If you know a man, and find out his good qualities, it is very difficult to hate him and raise your hand against him; on the other hand, if you know him, and find he is not a good sort of fellow, you can hate him with the better grace. Therefore, I think, it is a good thing to meet at these *alumni* dinners. It is a great thing to keep up our feelings of affection for our *alma mater*. I was dining with some old Oxford friends a few nights ago, and next week I shall be dining with another hospital, and that brings me to the question of the dental schools. So far as schools are concerned, I am rather more identified with a rival school—the rivalry is a friendly and healthy rivalry—but still it is a rival school. I mean the School of the Dental Hospital of London. There are, however, points in which I stand in as close connection with one school as with the other, as President of the Odontological Society, and as a member of the Board of Examiners of the College of Surgeons of England. The ancient Egyptians used at a certain period of their feasts to send round a mummy, or rather a sarcophagus case, after which conviviality was said to rise to its highest pitch. I may therefore be pardoned if I touch upon so dreary a subject as that of examination. I would ask you to look upon examiners as your best friends—at present they may be in disguise; but let me assure you they are your friends. We need something of stimulus to keep us up to our work; the student, as I intended to say, but Dr. Cunningham has said before me, the student is father of the

practitioner; there are very few men who being bad students become good practitioners, and conversely there are few bad practitioners who were good students; it is desirable, it is very important, that we should have that little spur during our school days which is afforded by examinations. And while I am on the question of school days I should like to say a word or two about examinations. There is a very general idea abroad that men often get rejected for failure in some one particular thing. Now during the time I have been an Examiner at the Royal College of Surgeons, without letting out the secrets of the prison-house, I may say there has never been a single student rejected for failure in one subject; there has never been a case where the general result has not been taken into account, and so I think you students may see that by good honest work you may make your examinations very much a matter of certainty. There is a power of rejection for failure in a single subject, but so long as I have been an Examiner it has never been exercised.

The great advantage which I conceive we have in being associated for examination purposes with an ancient corporation having very wide-reaching powers like the Royal College of Surgeons, is that we have no knowledge who we are examining. It would be intensely disagreeable to be an Examiner on behalf of a body composed mostly of one's own profession, a great number of the examined being friends and acquaintances, the sons of friends, pupils, and so forth, people who in many instances we knew and respected; it would be very much more disagreeable if the power of examination were only in our own body. But when we are asked to examine men whose names we never know, of whom we know nothing more than their number, then one is placed in a position of more pleasing independence. That, of course, is only an Examiner's view. Then the present students of this school have been associated in a new departure by having two lady medical students. Well, I have always had some feeling towards lady students. Some years ago I once took down to dinner a charming girl, who won her spurs in America, and who has since become a successful practitioner. I would only say that ladies who have taken up the subject of medicine have overcome all sorts of obstacles and opposition, they have stormed the hospitals, have been eager to be called "persons," and where "person" has been objected to, they have stoutly maintained they were men. They can now be examined by the Colleges of Edinburgh, in Ireland, and at London University; so far they they have not obtained the right to examination by the College of Surgeons or the College of Physicians in England, but if they make a vigorous effort I should not wonder if, after the manner of ladies, they get their way. I may congratulate you on having been the first to open your doors to the ladies. At this hour of the evening I will not keep you any longer. As I said before, when all present are students, no great inducement is needed to make them drink their own healths. I give you the toast of the "Past and Present Students," coupled with the names of Mr. F. Rose and Mr. Lankester.

Mr. F. ROSE (Liverpool), in replying, said he did not think there could have been a more appropriate person elected to propose the health of the students than Mr. Charles Tomes, for he believed no one would join issue with him when he said no other member of the dental profession had done so much in the way of literature for students as Mr. Tomes. If a student wished to become a shining light he could not do better than make himself acquainted with everything in the valuable little book of Mr. Tomes' "Dental Anatomy." He did not intend to say much that evening, but it gave him very great pleasure indeed to look round and see so many faces that he knew as a student; many more eloquent might have been found, but none who were more deeply in sympathy with students than himself. After giving an account of their struggles in Liverpool to put the dental school there in a position to take its place with the sister school at Manchester, struggles which he was glad to be able to tell them had issued in success, he concluded by thanking them on behalf of the past students.

Mr. LANKESTER, who met with a hearty reception, proceeded to give a sketch of the school's history during the past two years he had been connected with it, referring with satisfaction to the increase in numbers and the decrease of what might be called "short-time men." He appealed feelingly to the pockets of the students on behalf of funds for the much-needed new building, and in conclusion paid a warm tribute of esteem to their "worthy Dean."

Mr. F. WEISS, in a few appropriate and kindly sentences, begged leave to propose a toast which was not down on the list, viz., "The Health of their Secretary, Mr. Klugh."

Mr. KLUGH, who was received with musical honours, in replying, referred to the growth of the Hospital since he had been connected with it. Ten years ago there were only 8,000 patients, last year there were 35,000. In conclusion, he had much pleasure in telling them he believed they would have a good site in Great Portland Street for a new building, and he heartily appealed to them for funds.

The DEAN, whose rising was greeted with continued cheering, said:—Mr. Chairman, with your permission. Gentlemen, I should wish to address to you a few words, and the object of those words I am sure requires no special commendation at my hands. We have to thank Mr. Charles Tomes for so kindly taking the chair on this occasion. We feel it a great honour to have such a gentleman presiding over our dinner as the President of the Odontological Society. Sir John Tomes, as I have frequently, but more or less privately observed, is the father of scientific dentistry. Now Mr. Charles Tomes may be said to be the grandfather of much of the knowledge of many of our past and present students; that anomaly needs a little explanation, perhaps, which I can easily give, by saying that 15 years ago I had the great pleasure and benefit of being a pupil of Mr. Charles Tomes, and from hearing his lectures in the Dental Hospital of London, I think was engrafted in me my love for dental anatomy; and furthermore, from his weekly ministrations as one of the staff of that hospital, I gained from him much of my knowledge of dental surgery.

Having been for the past 10 years a teacher in our school, I may say that a great part of the knowledge I have been able to impart has primarily been derived from Mr. Charles Tomes; and therefore, gentlemen, you may look upon Mr. Tomes intellectually as your grandfather through me. I should like to take this opportunity of expressing my gratitude to Mr. Tomes, not only for the benefits I have derived from him as a student, but also for the many kindnesses he has shown me in my earlier days as a lecturer on dental anatomy. I think the work which our Chairman has undertaken and accomplished is one which every member of the profession worthy of being called a member very keenly appreciates. Our Chairman is not only known as a scientific dentist, but his skill as an artist has not been kept under a bushel. This was shown by more than one of his clever sketches which adorned the walls at the Cambridge meeting. Being in complete touch with the dental student, not only as a teacher, but also as a student having such warm and kindly feelings towards students, I think we have been very fortunate in securing his services this evening, and I am quite sure that with these few observations, inadequately expressing the virtues of Mr. Tomes, which are very difficult to speak of in his presence, you will give the toast of the health of Mr. Charles Tomes the reception it deserves.

The toast was drunk with enthusiasm, accompanied with musical honours.

Mr. TOMES briefly responded, and proposed "The Health of The Dean." Mr. Gaddes was an illustration of what he had said earlier in the evening, viz., that the student was father of the practitioner, for he was a model student, and the result had been that he had succeeded as a teacher; he had succeeded as an organiser, and he was now with them as their very successful and popular Dean.

Mr. GADDES having replied, the success of the evening was added to by songs, &c.

CORRESPONDENCE.

THE DANGERS OF THE DENTIST'S CHAIR.

To the Editor of THE DENTAL RECORD.

SIR,—The excerpt from "*The Hospital*" on the "Dangers of the Dentist's Chair," reprinted in your last issue, and presented without comment on your side—which, let us hope, was intended to be construed into a "silent satire"—will doubtless not call forth a single remark from your readers, except it be one of ridicule or resentment.

If there is one vocation more than another where the value of absolute and wholesome cleanliness is indicated, it is dentistry; and the profession, as a body, is the first to recognise and acknowledge its importance. Therefore may we justly repudiate that which is specifically implied therein, viz., the customary ignorance and dirty habits of dentists. But the portion of the article to which particular exception should be taken, as

calculated to be misleading, is the advice tendered to the profession to adopt linen antimacassars for the head-rests of their chairs. Now, during all my experience (by no means a small one) I can truthfully assert that I never yet witnessed a dental chair in use in private practice without the head of the patient rested upon a white linen antimacassar. I might hazard the statement that you would find the chair of every respectable practitioner furnished with it, and it would only be in a few isolated cases—the remaining vestiges of the barber-dentist element of yore—where it would be found wanting. Apart from regard to sanitary laws, motives of economy alone would be sufficient to suggest the expedient ; for a chair which costs from twenty to thirty-five pounds, claims a protection from soiling from greasy heads on its own account. Again, whilst the article in question is making war against the “Dentist’s Chair,” might it not justly have added that the same persons might contract the same diseases from the padded cushions of railway carriages, omnibuses, cabs and private carriages, theatres, waiting rooms, &c., perhaps even drawing rooms, and not have confined the *habitat* of disease germs to the dentist’s head-rest ?

No ; patients have little cause to fear contamination from our chairs, but there is yet a more terrible and deadly medium of transmitting disease from one patient to another, and that—through unclean instruments. The culpable negligence of some operators in not carefully sterilizing their instruments after use is unpardonable, and even criminal. All instruments should be cleansed and purified before being employed upon a second patient, and such as forceps, elevators, lancets, &c., which enter the soft tissues, should be plunged in a strong solution of carbolic acid or other germicide, and afterwards wiped and polished ere caused to operate on another patient. Professional men can grasp, *tout ae suite*, the potent medium of inoculation that here exists, but how many of our lay patients have ever reflected that they risk receiving constitutional taint through going to a reckless and unprincipled man to simply “have a tooth drawn.”

Yours, &c.,

FRED. A. BELLAMY.

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H.R. Abbott

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